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NUMERICAL ANALYSIS OF STIFFENED SHELLS OF REVOLUTION

Volume VI of VII

by V. Svalbonas and P. Ogilvie

Prepared by GRUMMAN AEROSPACE CORPORATION Bethpage, N.Y. 11714 for George C. Marshall Space Flight Center

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| | A list o | f all seven volum | nes, by sub-ti | tle, is on the | e back s | ide of this | page |
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| 16. | ABSTRACT | | | | | | |
| | 101s | manual contains | engineering | programming in | iormati | on for the S | TARS-2V |
| | (Shell The | eory Automated fo | r Rotational | Structures -2V | (Vibra | tion)) digit | al computer |
| | program. | The report is wr | itten for the | engineer who | will ne | ed to make s | mall |
| | alteration | ns to the program | , such as inc | orporating a n | ew geom | etry, or alt | ering a |
| | table size | e, to fit his spe | cific needs. | The sections | of the | manual each | cover one |
| | major sub | routine. These s | ections are f | urther subdivi | ded in | the followin | g manner |
| | where appl | licable: | • | | | • | |
| | A. | Subroutine desc | ription. | | | :. | |
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| | В. | A list of perti | nent engineer | | | | |
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| 19. | KEY WORDS | Counterparts. Subroutine flow Subroutine FORT | chart. | 18. DISTRIBUTI | ON STATEN | IENT | ed 22. PRICE \$3.00 |

- VOLUME I. Theory Manual for STARS-2S, 2B, 2V Digital Computer Programs
- VOLUME II. Users' Manual for STARS-2S Shell Theory Automated for Rotational Structures - 2 (Statics), Digital Computer Program
- VOLUME III. Users! Manual for STARS-2B, 2V Shell Theory Automated for Rotational Structures 2 (Buckling, Vibrations), Digital Computer Programs
- VOLUME IV. Engineer's Program Manual for STARS-2S Shell Theory Automated for Rotational Structures - 2 (Statics), Digital Computer Program
- VOLUME V. Engineer's Program Manual for STARS-2B Shell Theory Automated for Rotational Structures -2 (Buckling), Digital Computer Program
- VOLUME VI. Engineer's Program Manual for STARS-2.V Shell Theory
 Automated for Rotational Structures -2 (Vibration), Digital
 Computer Program
- VOLUME VII. Satellite Programs for the STARS System

ACKNOWLEDGEMENT

The authors wish to acknowledge the overall aid of Mr. J. Key, especially in the debugging phases of the UNIVAC program version.

INTRODUCTION

This manual presents a general description of the STARS-2V digital computer program. FORTRAN IV is used exclusively in writing the various subroutines. The execution of this program requires the use of eleven temporary storage units.

The program was initially written and debugged on the IBM 370-165 computer and then converted to the UNIVAC 1108 computer, where it utilizes approximately 47,000 words of core. Only basic FORTRAN Library routines are required by the program, these being: sine, cosine, absolute value, square root, min 0, max 0, amax 1, amin 1, and random.

For ease and speed in usage, the Table of Contents on the following page has also been laid out to present the call sequence of the program.

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SUBROUTINE MAIN

MAIN is the control link for the entire program. Sizing values are read into the program, as well as information for eigenvalue or determinant accuracy calculations, assumed frequencies and resonance factors, and the material property tables. Calls are made to subroutines RIEMAN and SEGMAT once for each segment in a region; then subroutine REGMAT is called. This procedure is executed once for every region in the structure. Finally a call to subroutine STRMAT is made. If the analysis involves prestressing, subroutines INITAL and LEBEGE are called. Otherwise the control link loops back and resets the clues for the calculation of dynamic stiffness matrices.

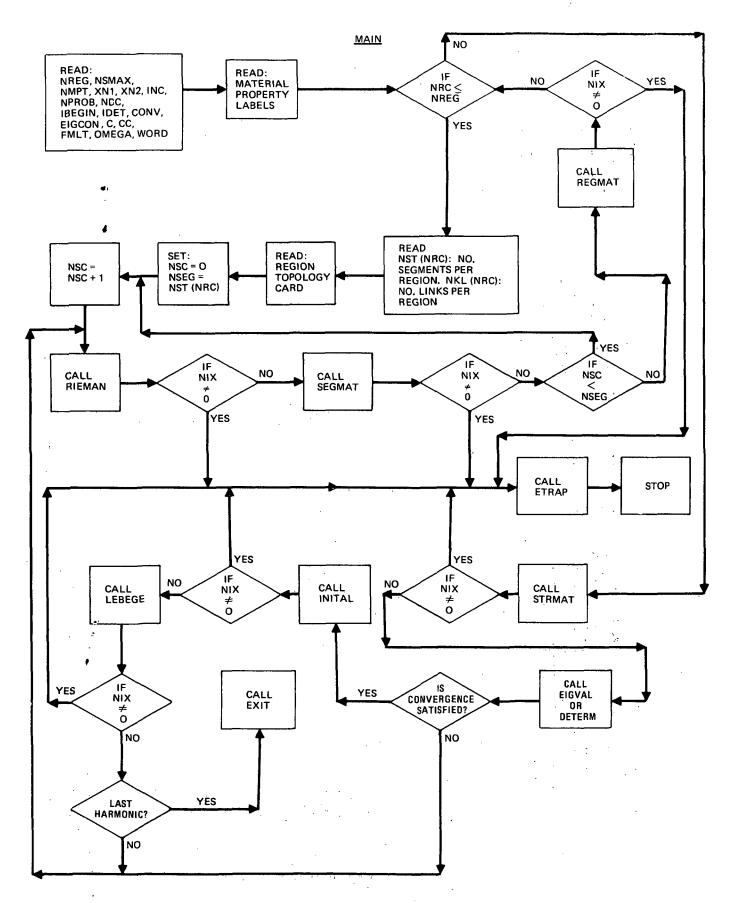
In the calculation loop for the dynamic stiffness matrices the program proceeds as above to STRMAT. Next EIGVAL or DETERM are called to calculate eigenvalues or evaluate a determinant as per user input. If these calculations satisfy convergence criteria, subroutines BCVECT, INITAL and LEBEGE are called. If convergence criteria are not satisfied the program will loop until such satisfaction is obtained.

In a multi-harmonic eigenvalue search the whole procedure loops on the harmonic number.

There are also several counters in this control link. These are defined as follows:

- NSC Counts the calls to subroutines RIEMAN and SEGMAT, from 1 to the number of segments within a region.
- NRC Counts the calls to subroutine REGMAT, from 1 to the number of regions in the structure.
- ICYC Cycle counter (counts harmonics).
- NPASS Pass counter (counts passes necessary to converge in a single harmonic).

The block data and overlay listings are included in this section.



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1TS AND ,12,35H KINEMATIC LINKS WITHIN THIS REGIØN)
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IF (NPAS,NE,0) WRITE(6,611) NPAS
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                                                                                                                                                                                                         F (XN1.NE.O.BR.ICYC.GT.I) GB TB 94
                                                                                                                       IF (XN.GT.XN2) GB TB 1
GB TB (91,92,93,92,93,92),IMBRD
                                                                                                                                         XNL(3) = 1.0
IF (ICYC.6T.1) XNL(3) = 0.0
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CALL ETRAP
STOP
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SEG RUBIT
IN NBF244
IN MBF244
IN MBF244
IN MBF244
IN RIEMAN, SELDATA
SEG RIF+, (RUBIT)
IN DIFT
SEG DF7+, (RIE)
IN DIFT
IN SEGATI, SHEVE
SEG SGMAT, SHEVE
IN SEGATI, SHEVE
SEG SGMAT, SHEVE
IN SWITCH, RIED, FUTILE
SEG RIGH*, (RWIN)
IN SWITCH, RIED, FUTILE
SEG REC*, (RING)
IN SWITCH, RIED, FUTILE
SEG REC*, (RING)
IN SINGER
SEG REC*, (RING)
IN STRAT, FLEX
SEG REC*, (RING)
IN STRAT, FLEX
SEG BCV*, (SMCH)
IN STRAT, FLEX
SEG BCV*, (SMCH)
IN STRAT, FLEX
SEG BCV*, (SMCH)
IN SEGATI, SHEVE
SEG BCV*, (SMCH)
IN DETER*, (RWIT)
IN DETER*, (BRIT)
IN DETER*, (BRIT)
IN DETER*, (BRIT)
IN LEBGE*, FIXEM*, TEMBEG, PLYNE, PLYCO
SEG DOI*, (LEB)
IN BOE?
SEG BOOX*, (LEB)
IN BOE?
SEG BOOX*, (REB)
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SEG BOOX*, (RRB)
IN BOE?
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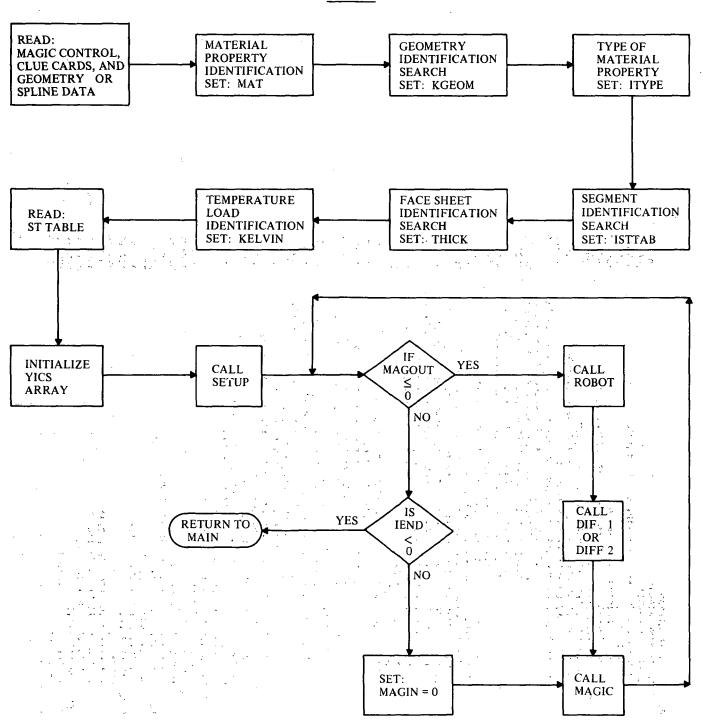
SUBROUTINE RIEMAN

This subroutine link assembles the data tables for use in the integration procedure. The program has the capability of handling two loading conditions (due to rotation or static prestress). Temperature load can be included in the static prestress.

The subprogram link, RIEMAN, utilizes the subroutines SETUP, ROBOT, DIF1, or DIFF2, to integrate the differential equations of each segment independently, under arbitrary load conditions. The results of the integrations of each segment are stored in the YCORR array in RIEMAN, and represent the stiffness and deflection coefficients of each segment.

| F | ORTRAN CODE | ENGINEERING SY | MBOLS (REF. 1) | |
|--|-------------|----------------|----------------------------------|-----|
| | XFTHLD | | f | |
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| i in | XMTHLD | | m _θ | |
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| | XNUTP | | νθφ | |
| | XNUPT | | V _{φθ} | |
| | ALPHTH | | α _θ | |
| | ALPHPH | | α _φ | |
| | XNTTH | | $^{ m N}{ m T}$ $_{ m \Theta}$ | |
| | XNTPH | | $^{ m N}_{ m T}{}_{ m \varphi}$ | |
| | XMTTH | , | $^{ m M}_{ m T	heta}$ | |
| | XMTPH | | $^{ m M}_{ m T \phi}$ | . * |
| | XKll | · | K _{ll} | ٠ |
| | XK22 | · | K ₂₂ | • |
| , | XD11 | | D ₁₁ | |
| | XD22 | | D ₂₂ | |
| | хк33 | | К ₃₃ | |
| | XD33 | · | D ₃₃ | |
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RIEMAN



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JRSTØP(30),NREG,NMPT,NRC,NSC,NIX,IERRØR,KGEØH,IGEØH,ISTTAB
KELVIN,IBEGIN,NPRØB,NSEG,NERRØR,Q,THICK,NØJS,NLINKS,NLCASE
NTSKL,NZ,NBCT,LINPUT,NTRKL,NPASS, NI,KBC,NRINGS
                                                                                                                                                                                                                                                                                                  YDØT, YASAVE, YANTH, YAMTH, YAMPT, YAJPH, S. SN. CS, SNSQ,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XMTHLD, XMPHLD, ETHET(2), EPHI(2), XGPT(2), ALPHTH(2), ALPHPH(2), DUM,
                                                                                                                                                                                                                                                                                                                            CSSQ.TAN.SEC.CN.X1CS.X1SN.TN.X1RB.X1RBSQ.X1SNRB.
                                                                                                                                                                                                                                                                                                                                                      KICSRB, CNIRB, SNIRB, CSIRB, XIRI, XIR2, CSIR1, CSIR2,
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                                                                                                                                                                                                                                                                                                                                                                             SNIR1, XIR1SQ, R2SQ, R0, BESQ, R0SQ, XNSQ, R1, R2, S1,
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                FACE(4),STRGB(7),THERM(4),MATER(3),SEGTAB(12)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  COMMON /SPLINS/ ANG, PSI(100), RAD(100), CURI(100), CUR2(100),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              COMMON /PLS/ BMEGA, IMBRD, XMERD, XPRES, XMBNT, AZERB, ABNE, ATWB
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    S, SN, CS, SNSQ, CSSQ, TAN, SEC, CN, X1CS, X1 SN, TN,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       STØRY(16), XMAT(110,10), STD(10), SADUS(30), RADUS(30)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XN, TEFREE, TIC, PHI, STBP, RESTBP, RTICK, G1, XNL(3), NH
                                                                                                                                                                                                                                              PRECISION DELTA, DTIME, EPSIL, XSAVE2, XSAVE3, XSAVE4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      KNPHI,M, I, BETTA, ZETTA, SAVY(8), XC16
                                                                                                                                                              DBUBLE PRECISION SAVTIC, TIC, PHI, STOP, RESTOP, RTICK
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XK11, XK12, XK21, XK22, XK33, XD11,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                :BMMBN /EQUAZN/ YPRED(80), YDBT(80), YASAVE(80),
                                                                                                                                                                                                                    PRECISION ARG, ERR, DIFF, DIAU, STEP, TIME
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        DIMENSION LST(13), YDEV(80), YICS(80), YNEW(80)
                                                                           INTEGER SAVJTC, SAVSTP, SEGTAB, Q, THICK, TYPE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             YANTH, YAMTH, YAMPT, YAJPH,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            DRIDP(100), ZI(14), RI(14), NRZIN
                                                                                                                                                                                                                                                                        DØUBLE PRECISION YDEV, YICS, TBDEL, FWDE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ADUS(30), UADUS(30), SAVTIC(900
                                                                                                                                                                                                                                                                                                                                                                                                                                                                XDII, XNPHI, BETA, XC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   READ(5,1001, END=9998) RGB, ANG, STURY
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    RØSQ, XNSQ, BETA, RI, RZ, SI, RIDØT,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    COMMON JARING/ NRING(28), AMAT(30,4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           DIMENSION ST(72,31), XLAYER(10)
DIMENSION TMPAV(5)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    WRITE(1) UTAU,DIFF,SIEP,DELTA
IF (RGW_EQ_14.0) GW TW 180
READ(5,1006) G1,G2,G3
                                                                                                                                    YNEW, YPRED
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  DIMENSION TBDEL(80), FWDEL(80)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      READ(5,1002) DTAU, DIFF, STEP
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               /LYCØRR/ YCØRR(80)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            WRITE(1) RG0, ANG, STØRY
                                                                                                                                                                                          PRECISION YCORR
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                                                                                                                                 PREC 1S 1 BN
                                                   SQRT(X) = DSQRT(X)
                         SUBRBUTINE RIEMAN
                                                                                                                                                                                                                                                                                                  BUBLE PRECISION
FOR, IS RIEMAN, RIEMAN
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          186 FØRMAT(//57x;24HCEØMETRY INPUT VARIABLES//42x,16HAXIAL CØØRDINATE,
1 9x,6HRADIUS/50x,1HZ,20x,1HR/(43x,1PlE15.8,5x,1PlE15.8)
                                                                                                                                                                                                                                                                                                                                                                                                                      WRITE(6,651) NSC,1,STØRY,DTAU,DIFF,STEP,DELTA
FØRMAT(//13x,15HSEGMENT NUMBER ,[2,5x,13HSEGMENT CØDE ,[2,5x,
l 16A4//22x;4HDTAU,15x,4HDIFF
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  FORMATI (//54x,24HGE@METRY INPUT VARIABLES,//38X,3(E14.7,5X))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            645 WRITE(6,653) TYPE, HLAYK, SHEET, INTERP, RANKIN, TEFREE, NP
                                                                          READ(5,1003) TYPE, HLAYR, SHEET, INTERP, RANKIN, TEFREE, NP
                                                                                                                              WRITE(1) TYPE, HLAYR, SHEET, INTERP, RANKIN, TEFREE, NP
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              2,15x,4HSTEP,10x,5HDELTA//16x,5(E14.7,5x),2X,F2.C)
                                                                                                                                                                                                                                                                                                         KEAD(1) TYPE, HLAYR, SHEET, INTERP, RANKIN, TEFREE, NP
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  653 FBRMAT(//12X,5(A4,6X),9HT FREE = ,E10.3,12X,
180 READ(5,198) NRZIN, (ZI(J), RI(J), J=1, NRZIN)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    26HNUMBER OF TABLE COLUMNS = .12)
                                    WRITE(1) NRZIN, (ZI(J), RI(J), J=1, NRZIN)
                                                                                                                                                                                                                                                                   READ(1) NRZIN, (ZI(J), RI(J), J=1, NRZIN)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        WRITE(6,186) (ZI(I),RI(I),I=1,NRZIN)
                                                                                            FØRMAT(5(A4,6X),E10.1,10X,12)
IF(NP.LT.2,8R.NP.GT.30) GB TØ 8787
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        MATERIAL PROPERTY IDENTIFICATION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    IF(INTERP-SEGTAB(1))510,511,510
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            IF (HLAYR-STD(I)) 501,502,501
                                                                                                                                                                      READ(1) RGB, ANG, STBRY
READ(1) DTAU, DIFF, STEP, DELTA
IF (RGB, EQ. 14.0) GB TB 182
READ (1 ) G1, G2, G3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          IF (TYPE-MATER(I))506,507,506
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              IF (RGB-STRGB(1)) 504,505,504
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              IF (RGB.EQ.14.0) GB TB 185
                   FBRMAT(12,7F10.0/7F10.0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  WRITE(6,652) G1,62,63
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              DØ 501 I=1,NMPT
                                                                                                                                                                                                                                                                                                                           EPSIL =1.0E-05
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              DB 504 I = 1,7
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                                                                                                                                                                                                                                                 GØ TØ 183
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                                                                                          GØ TØ (430,430,420,420,420,420,425,425,425, 430,430,430),ISTTAB
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                WRITE(6,654) ((XMAT(I,J),J=1,10),I=II,III.)
FØRMAT(//51X,28HMATERIAL PRØPERTY TABLE USED,//(10(1H ,E12,5)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               FORMAT(1H ,8(E14.7,2X)/(3X,8(E14.7,2X)))
                                                                                                                                                                              TEMPERATURE LØAD IDENTIFICATION
IF (SHEET-FACE(I)) 508,509,508
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        IF(Q.EQ.1) G0 T0 193 (KEAD (5,1005) (ST(I,J),J=1,NP) F0RMAT (5E14.7)
                                                                                                                                                                                                                 IF (RANK IN. EQ. THERM II) GBTB 402
                                                                                                                                                                                                                                                                                         LINEAR ANALYSIS IDENTIFICATION
                                                                                                                                                                                                                                                                                                                                            = .THICK+3
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              IF (NH.NE.0) GØ TØ 901
WRITE(6,600) (ST(1,J),J=1,NP)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               IF (NH.NE.0) GØ TØ 921
WRITE(6,654) ((XMAT(I
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          IF (ISTTAB.EQ.12)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         DØ 901 I=1,NRØW
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            (·ISTTAB.EQ.11)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               = 2*(MAI-1)+1
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IF (NH.NE.O) GB TB 665
IF ERMAT(Z) GB TB 665
INTEC LBADS (F THETA, F PHI, F ZETA, M THETA, M PHI),)
NRITE(6,1968) (LST(J),J=JI,JI)
1968 FBRMAT(Z)H LBAD IDENTIFICATIBN CLUES ,611/)
NRITE(6,600) (ST(N,J),J=I,NP)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       FORMATI / /45x, 42HTABLE BRDER PHI BR S VS. TEMPERATURE LBADS, 1
                                                                                                                                                                     IF (NLC.GT.1.AND.LST(1).NE.O.AND.LST(JT).NE.0) GØ TØ 8008
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    If (Q.EQ.1) GØ TØ 2004
KEAD (5,591) IS,SAVJTC(IIS),SAVSTP(IS),(STØRY(I),I=1,16)
                                                                                                                                                                                                                                                                                                                                                     ) (ST(M,J),J=1,NP)
                                                                                                                                                                                                                                                                                                              KEAD (5,1005) (ST(M,J), J=1,NP)
NRITE(1)
GW TW 72
READ (1 ) (ST(M,J), J=1,NP)
                                                   IF(Q.EQ.1) GB TB 195
READ(5,1004) (LST(J), J=JJ,JJJ)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    DØ 657 N=KY,KZ
WRITE(6;600) (ST(N,J),J=1,NP)
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LY = K
                                                                                    WRITE(1) (LST(J),J=JJ,JJJ)
GB TB 196
                                                                                                              REAU(1) (LST(J), J=JJ,JJJ)
CØNTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                                   K = KZ+1
IF (NH.NE.0) GØ TØ 665
                                                                                                                                        1F(LST(JJ))8031,19,20
                                                                                                                                                                                                            L=L+1
|F{JJ_EQ_JJJ) G0T0 24
JJ=JJ+1
                                                                                                                                                                                             IF(LST(JJ))8031,22,21
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                                                                                                                                                                                                                                                              IF (L.EQ.0) GB TB 71
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00 17 NLC=1,NLCS
JT = JJ
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                                                                                                                                                                                                                                                                                                                                                                                                                     KZ = K+LST(1)-1
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                       JTT= JJJ -
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                                                                                                                                                         20 L = LST(JJ)
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XLAYER(M)=XMAT(J,I-1)+(XMAT(J,I)-XMAT(J,I-1))*(ARG-XMAT(II,I-1))/-
| (XMAT(II,I)-XMAT(II,I-1))
                                                                                                                                      DØ 57 IK=2,NTØTAL
ST(IK,LL)=ST(IK,I-1)+(ST(IK,I)-ST(IK,I-1))*(ARG-ST(1,I-1))/(ST(1,I
                                                                                                                                                                                                                           THE UPDATED INTERPRLATED VALUES OF THE MATERIAL PROPERTY COEFFIC
LENTS ARE FOUND IN THE XMAT TABLE AND STORED IN THE XLAYER ARRAY
                                                                                                                                                                                                                                                                                                                                                                                                     IMPAV(IL@W)=(ST(L,LL)+ ST(L+1,LL)+ ST(L+2,LL) + ST(L+3,LL))/4.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                 IMPAV(ILBM) = (ST(L,LL)+ ST(L+1,LL))/2.0
IMPAV(IHIGH)=(ST(L+2,LL) + ST(L+3,LL))/2.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      (ARG-XMAT(II, I) 121, 123, 104
                                                                                                                                                                                                                                                                                                                                                                             IFIKELVIN .NE. 1)GB .TB 85
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   GBTB (91,92,93,93), KELVIN
                                                                                                                                                                                                                                                                                                                  81
                                                                         IF(ARG-ST(1,1)) 52,55,51
IF(I-1) 55,55,54
                                                                                                                                                                                                                                                                                                                IF (KELVIN .NE. 1)GB TB
IF (THICK.NE.1)GB TB 83
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   IF (1-2) 8007,8007,124
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           DØ 105 IL=ILØW, IHIGH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XLAYER(M)=XMAT(J, I)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 AKG = ST(NRØH+1,LL)
                                                                                                                                                                                                    ST(1K, LL)=ST(1K, 1)
15 LT=LT+LST(J)
296 NT@TAL = LT+NSAVE
                                                                                                                                                                                        DB 58 1K=2,NTØTAL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           104 1 = 2,10
                                                                                                                                                                                                                                                     = (MAI-1) *2+1
                                                                                                                                                                                                                                                                             [ ] [=NXMAT(L+1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  00 122 J=L, 111
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ARG= TMPAVIIL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               TMPAV(1) = ARG
                                                             DB 51 1=1,NP
                                                                                                                                                                11-ST(1,1-1))
                                                                                                                                                                                                                                                                 ( I =NXMAT (L)
                                                                                                                                                                                                                                                                                                      =NROW + 1
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                                                                                                                                                                                                                                                                                                                                                                 [HIGH = 1
                         PHI=TIME
                                                                                                                                                                                                                                                                                                                                                                                            CONTINUE
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                                                                                                  CONTINUE
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                                                                                                                                                                            GOTO 80
                                      ARG=PHI
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            GBTB 94
                                                  LL=NP+1
                                                                                                                                                                                                                                                                                          _L=NP+1
                                                                                                                                                                                                                                                                                                                                                                                                                                           11.64= 1
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| 92 | | 303730 |
| | 00 922 J=L,1[] | 30374 |
| 922 | X X X X X X X X X X | 1005 1005 |
| 111 | | 30377 |
| 112 | XNUTP= XLA | 30378 |
| | FF(ITYPE.NE. 1)G0 T0 131 | 30379 |
| | XGPT(1) = ETHET(1)/(2*(1+ XNUPT)) | 303806 |
| | = ETHET(2)/(2*(1+ | 30382 |
| 161 | GB TB 10 | 30383 |
| 101 | | 30385 |
| | GM TØ 106 | 30386 |
| 113 | | 30387 |
| | ALPHS=XLAYER(10) | 303886 |
| 114 | ALPHR | 30390 |
| | | 30391 |
| 115 | GR 18/101,102,1031,1TVPE | 303920 |
| 101 | ETHET(IL) = XLAYER(1) | 30394 |
| | XNUTP = XLAYER(2) | 303950 |
| | ALPHINILL * XLAYEK(3) [PHICH] = FTHFT(1) | 36.596 |
| | | 30398 |
| | = ALPHTH(IL) | 30399 |
| | XGPI(IL)= EIHEI(IL)/(Z.O*(I.O+ XNUPI)) | 30400 |
| 102 | | 30402 |
| | EPHICIL) = | 30403 |
| | XNUTP = XLAYER(3) | 30404 |
| | ALPHRILLS XLAYER(4) ALPHPH(11)* XLAYER(5) | 30405 |
| | . 16 | 30407 |
| | | 30408 |
| | GB IB IDS FOHICE (= X1 AVER (2) | 30404 |
| | • | 304120 |
| 103 | ETHET(IL)= XLAYER(I) | 30410 |
| | ALPHIH(IL) = XLAYER(4) | 30413 |
| | , X | 30415 |
| | ER= XLAYER(7) | 30416 |
| | ָרַ ראַ | 30417 |
| | ALPHK = XLAYER(9) | 304180 |
| | = ETHET(1 | 30420 |
| 105 | CONTINUE | 30421 |
| 106 | C = NROW+1 C T = (17.107.108.110.118) 1 8 0 0 | 30422 |
| 107 | LØGP= 3 | 304240 |
| | 11.6W = 3 | 30425 |
| | [HIGH= 3 GB TB 82 | 30426 |
| 108 | IF(II) | 30428 |
| - | GB TB 118 | 30429 |
| 7 | ו המנה: ו רמא: | 304310 |
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                                                                                                                                                                                                                                                                                                                 CALL RØBØT(ST,KLUEZ,NRØW,LL,ER,ES,GZ,G3,TIME,ITIC,JTIC,NCYC,NCØNT)
1F (NIX.NE.O) GØ TØ 9999
CØMPUTATIØN ØF K AND D FØR K AND O INPUT
                     IF(ISTTAB.GE. 10.4ND. ISTTAB.LE. 12)CPH = ST(6.LL)
IF(CPH .LE.0)GB TØ 281
                                                                                                                                                  |F(|STTAB.GE. |O.AND. |STTAB.LE. |2)CTH = ST{7,LL}
|F(CTH ..LE. 0)GB T0 |16
                                                                                                                                                                                                                                                                                                                                                                               IF(ITYPE.EQ.3.AND.XK12.EQ.O.) GØ TØ 8102
IF(ITYPE.EQ.3.AND.XK21.EQ.O.) GØ TØ 8103
                                                                                                                                                                                                                                                                                                                                                                                                                                           (F(XK22.EQ.0.0) GBTØ 8104
|F(XK33.EQ.0.0) GBTØ 8105
|F(XD11.EQ.0.0) GBTØ 8106
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      IF(XD22.EQ.0.0) GBTE 8109
IF(XD33.EQ.0.0) GBTE 8110
                                                                                                                                                                                                                                                                                                                                                                     [F(XK]].EG.0.0) GBTB 810]
                                                                       TMPAV(4) =ST(L+3,LL)
                                                                                                                                                                                                    TMPAV(5)= ST(L+3,LL)
                                                                                                                                                                                                                                                      ALPHTH(2)=ALPHTH(1)
                                                                                                                                                                                                                                                                  ALPHPH(2)=ALPHPH(1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              F (NH.EG.O) NLCSE
                                                                                                                                                                          TMPAV(5)= ST(L,LL)
                                                TMPAV(4)= ST(L,L)
                                                                                                                                                                                                                                          ETHET(2)= ETHET(1)
                                                                                                                                                                                                                                                                             XGPT(2) = XGPT(1)
EPHI(2) = EPHI(1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XSAVE1 = XNTTH
XSAVE2 = XNTPH
XSAVE3 = XMTTH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   NLCSE = NLCASE
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              CMPHLD=0.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XNTTH = 0.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         KNTPH = C
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     KFZELD=C.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     CMTTH = C
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         KFPHLU=0.
                                                                                                                                                                                                                                                                                                      CONTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XMTPH = C
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(H1GH = 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = NROW
                                                                                                                                                                                        GØ TØ 85
                                                                                                                                                                                                                               CONTINUE
                                                                                                                            1H IGH=5
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                                                                                                               11.04=5
                                                                                                   1.00P=5
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                                                                                                                                               IF (JKL.EQ.2.0R.M.EG.10.0R.INDRD.EQ.3.8R.INDRD.EQ.5) GB TB 148
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             250 CONTINUE
49 IF (ISTTAB.GE.3.AND.ISTTAB.LE.9)GØ TØ 4002
CALL DIFI (XFPHLI.XFZELI.XFPHL2,XFZEL2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              4002 CALL DIFF2 (XFPHL1, XFZEL1, XFPHL2, XFZEL2)
77 CBNTINUE
                                                                  F (I.EQ.1.AND.NH.NE.0) GØ TØ 252
                                                                                                                                                                                 [F(LST(IR).NE.0) K=K+LST(IR)
IF (LST(IR+1).EQ.0) G0T0 44
                                                                                                                                                                                                                                                                                                                   XMTHLD=ST(K,LL)
47 IF(LST(IR+5).EQ.0) G010 48
                                                                                                                                                                                                                 XFTHLD=SI(K,LL)
IF(LST(IR+2).EQ.0) GBIB 45
                                                                                                                                                                                                                                                 XFPHLD=ST(K,LL)
45 IF(LST(IR+3).EQ.0) GBTØ 46
                                                                                                                                                                                                                                                                                  XF2ELD=ST(K,LL)
IF(LST(IR+4).EQ.0). G010 47
                                                                                                                                                                                                                                                                                                                                                                                                                                               149 CBNTINUE
IF (JKL.EQ.2) GØ TØ 251
                                                                                                                                    DØ 250 JKL=1,NLCSE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XFPHL1 = XFPHL0
XFZEL1 = XFZEL0
251 XFPHL2 = XFPHLD
XFZEL2 = XFZEL0
                                                                             IF (M.LT.9) GOTO
                                                                                                                                                                                                                                                                                                                                                                                                           XFZELD = XPRES
XMTHLU = XMBNT
XMPHLD = 0.0
                                                                                                                                                                                                                                                                                                                                                      XMPHLD=ST(K,LL)
                                                                                                                                                                                                                                                                                                                                                                        G0 T0 149
148 XFTHLD = C.0
XFPHLD = XMERD
                                                                                                   XNTPH = XSAVEZ
XMTTH = XSAVE3
                                                                                                                         XMIPH = XSAVE4
                                                                                        XNTTH = XSAVE1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               BOCI 1ERRØR=8001
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 8002 IERRØR=8002
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   IERRØR=8007
          ANALYS=0MTH
                      ANALYS=NPH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             NERRBR=15
Gøtø 8888
                                                                                                                                                                       IR=NL#6-5
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          NERROR=1.1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      GØT@ 8888
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            NERROR=12
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       GØTØ 8888
                                                                                                                                                                                                                                                                                                                                                                  CONTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    GBT8 75
                                                                                                                                                            NL=NL+1
                                                                                                                                                                                                       K=K+1
                                                                                                                                     252
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   8007
                                                                                                                                                                                                                              44
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| 0559 0559 0559 0559 0559 0559 0559 0559 | 305720 305730 305730 305740 305870 305880 305880 305880 305880 305880 305880 | 0599 0599 0599 0599 0599 0600 0600 | 0602 0603 0603 0606 0606 0608 0601 0611 0611 0611 0611 |
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G010 8888 8102 IERRØR = 8102 NERRØR=18

G010 8888 8103 1ERRØR = 8103 NERRØR=19

NERRØR=10

CØ TØ 888

CØ TØ 888

CØTØ 888

CØTØ 888

BO36 IERRØR= 2

CØTØ 888

BO87 IERRØR= 4

CØTØ 888

BO87 IERRØR= 8087

NERRØR= 5

CØTØ 888

BO89 IERRØR= 6699

NERRØR= 6699

CØTØ 888

BO90 IERRØR= 6699

NERRØR= 6699

NERRØR= 6699

NERRØR= 66991

8008 1ERRØR = 8008

GBTB 8888 8106 IERRØR = 8106

G010 8888 8107 1ERRØR = 8107 NERRØR=23

GØTØ 8888 8108 IERRØR = 8108 NERRØR=24

8.110 IERRØR = 8110 NERRØR=26

GØTØ 8888

GBTB 8888 : 1ERRBR = 8787

NERROR=34

8888 NIX=1 8787

8109 IERRØR = 8109 NERRØR=25

CØTØ 8888

G010 8888 8104 IERRØR = 8104 NERRØR=20

GØTØ 8888 8105 1ERRØR = 8105 NERRØR=21

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150 C@NTINUE

If (NH.ME.D) G@ T@ 925

WRITE(6.670)

WRITE(6.672)

WRITE(6.672)

WRITE(6.672)

WROUNTISTERS AND Y (TRANSPØSED) MAGIC ØUTPUT)

WROUNTISTERS AND Y (TRANSPØSED)

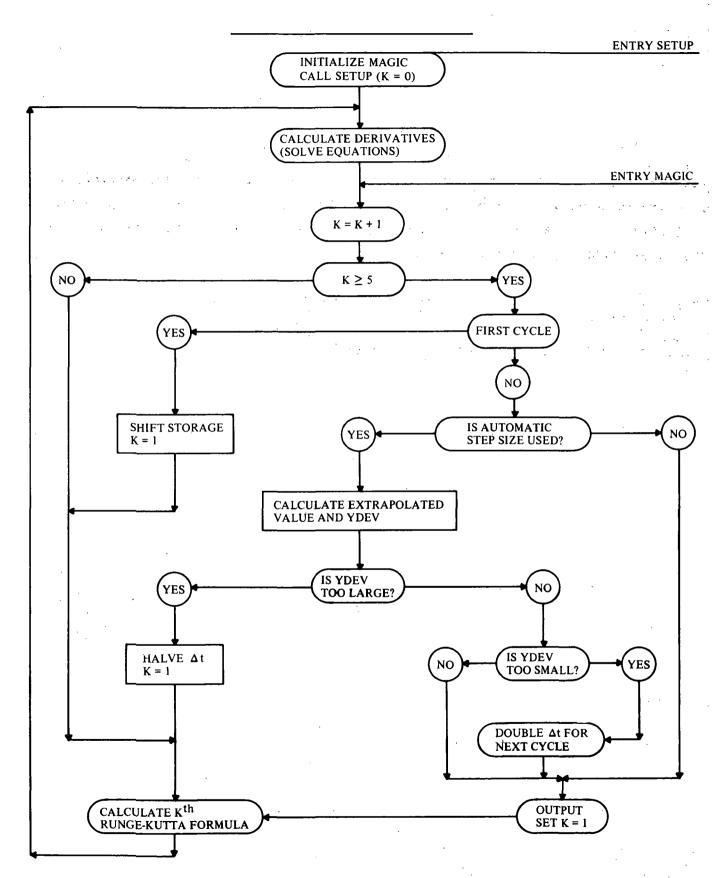
WROUNTISTERS AND Y (TRAN
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SUBROUTINE SETUP

SETUP is a double entry subroutine called from RIEMAN. It is a mixed precision, numerical integration routine, with automatic selection of a variable integration step size, which utilizes fifth order Runge-Kutta equations to obtain the solution for first order differential equations.

SUBROUTINE MAGIC

MAGIC is an alternate entry point to subroutine SETUP.



SUBROUTINE ROBOT

This subroutine is used by RIEMAN to calculate geometric and load coefficients for use in the differential equations. With reference to geometry, all the necessary radii are calculated, as well as the stiffness coefficients of the various shell wall constructions. Thermal load moments and direct forces are also calculated from direct temperature input. Loads due to rotation, and the shell wall areal mass are also calculated by ROBOT.

All the above values are passed back via the label common area EQUAZN.

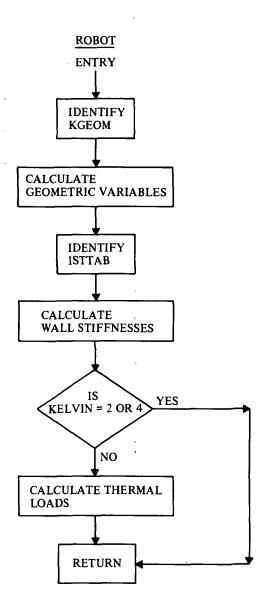
In the case of a special point input geometry the ROBOT routine calls GEOMET.

Subroutines GEOMET, PLICO, PLINE

Starting from a set of z, r points these subroutines calculate the necessary radii of the shell curves using spline fits.

| FC | DRTRAN CODE | ENGINEERING SY | MBOLS (REF. 1) |
|---------|----------------------------------|----------------|--|
| _ | RO | • , | r ₀ |
| | Rl | | r ₁ |
| | RIDOT | | r _{1, \phi} . |
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| n swy s | SN | | sin φ |
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| | TO . | | to |
| | SNSQ | | $\sin^2\!\phi$ |
| | CSSQ | | cos ² φ |
| | CN | 4 | cos φ sin φ |
| | X1CS | | l/cos ¢ |
| | X1SN . | | l/sin φ |
| | R2 | | r ₂ |
| | BETA | 0.0 | β |

| FORTRAN CODE | ENGINEERING SY | MBOLS (REF. 1) |
|--------------|----------------|-------------------------------|
| X1ROSN | | $1/r_0 \sin \phi$ |
| X1ROCS | 1 | $1/r_0 \cos \phi$ |
| CSX1RO | | $\cos \phi/r_0$ |
| CSX1R1 | | cos ϕ/r_1 |
| CSX1R2 | | cos ϕ/r_2 |
| SNX1RO | . : | $\sin \phi/r_0$ |
| SNX1R1 | | sin ϕ/r_1 |
| XlRl | | 1/r ₁ |
| X1R2 | | 1/r ₂ |
| XlRlSQ | | 1/r12 |
| X1ROSQ | | 1/r ₀ ² |



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                                                                                                                                                                          DØUBLE PRECISIØN SAVTIC,TIC,PHI,STØP,RESTØP,RTICK
DØUBLE PRECISIØN TEMP1,TEMP2,TEMP3,TEMP5,TEMP5,TEMP8,TEMP10,TEMP11
                                                                                                                                                                                                                                   DBUBLE PRECISION YDDT, YASAVE, YANTH, YAMPT, YAJPH, S, SN, CS, SNSQ,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                COPMON NST(30),NKL(30),NXMAT(20),SAVJTC(30),SAVSTP(30),JRTIC(30)
COPMON JRSTOP(30),NREG,NPT,NRC,NSC,NIX,IERROR,KGEOM,IGEOM,ISTTAB
COPMON KELVIN,IBEGIN,NPROB,NSEG,NERROR,Q,HHICK,NØJS,NLINKS,NLCASE
COPMON NTSKL,NZ,NGCT,LINDIN,NTRKL,NPASS,XNI,KBG,NRINGS
COPMON NTSKL,NZ,NGCT,LINDIN,NTRKL,NPASS,XNI,KBG,NRINGS
                                                                                                                                                                                                                                                                     CSSQ, TAN, SEC, CN, XICS, XISN, TN, XIRB, XIRBSQ, XISNRB,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            R2,S1,R1D@T,XNTTH,XNTPH,XMTTH,XMTPH,XFTHLD,XFPHLD,XFZELD,
                                                                                                                                                                                                                                                                                                    XICSRØ, CNIRØ, SNIRØ, CSIRØ, XIRI, XIRZ, CSIRI, CSIRZ,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                CSIRI, CSIRZ, SNIRI, XIRISQ, R2SQ, RB, BESQ, RBSQ, XNSQ, BETA, RI,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XC11, XC22, XC15, XD33, XD22, XD21, XD12, XK11, XK12, XK21, XK22,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              SNIR1, XIR1SQ, RZSQ, RØ, BESQ, RØSQ, XNSQ, R1, R2, S1, R1DØ1, XNIH, XNTPH, XMTH, XMTPH, XKII1, XC22, XC15,
                         SUBRBUTINE ROBOT (ST, KLUE2, NROM, LL, ER, ES, G2, G3, TIME, ITIC, JTIC,
                                                                                                                                                                                                                                                                                                                                                                                         XD33,XD22,XD21,XD12,XK11,XK12,XK21,XK22,XK33,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       YAMPT, YAJPH, S, SN, CS, SNSQ, CSSQ, TAN, SEC, CN, X1CS, X1SN, TN,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XIRØ, XIRØSQ, XISNRØ, XICSRØ, CNIRØ, SNIRØ, CSIRØ, XIRI, XIRZ,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  COMMON /PLS/ OMEGA, IMORD, XMERC, XPRES, XMENT, AZERB, AGNE, ATWO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XK33,XD11,XNPH1,M,1,8ETTA,ZETTA,SAVY(8),XC16
/SPLINS/ ANG,PSI(100),RAD(100),CUR1(100),CUR2(100),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XMTHLD,XMPHLD,ETHET(2),EPH1(2),XGPT(2),ALPHTH(2),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              IBRY(16), XMAT(110,10), STD(10), SADUS(30), RADUS(30)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          COMMON XN, TEFREE, TIC, PHI, STOP, RESTOP, RTICK, G1, XNL(3), NH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   GUTØ (771,772,773,774,775,776,7077),KGEØM
GEØMETRY FØR ELIPSE(G3=ØFFSET DISTANCE )
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ADUS (30), UADUS (30), SAVTIC (900)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         DRIDP(100), ZI(14), RI(14), NRZIN
                                                                                                                                                                                                                                                                                                                                                                                                                        KOII, XNPHI, BETA, XC16
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      COMMON /ARING/ NRING(28), AMAT(30,4)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ALPHPH(2), DUM, XNUTP, XNUPT,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    R2 = A*DSGRT(1.0/(SNSQ+BESQ*CSSQ))
                                                        NCYC, NCBNT
                                                                                     INTEGER SAVJIC, SAVSIP, Q, THICK
                                                                                                                                                                                                                                                                                                                                                                                                                                                     DOUBLE PRECISION YPRED, TIME
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              A) **2*(CS/SNSQ)*(R1*SN-RB)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          0.0168 18 779
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              DIMENSION ST(72,31)
                                                                                                                    INTEGER XNI; XNZ; XN
FOR, IS ROBOT, ROBOT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                SN = DSIN(PHI)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               CS = DCBS(PHI)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              K250 = R2**2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       BES0=BE**2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      BESG=BE**2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              DATA A/-A
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        BETA = BE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     KIDØT=0.C
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      AS0=A**2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             RB=R2#SN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                COMMON
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           = bsns
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             COMMON
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  A=61
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                                                                                                                                                               RD = RAD(J-1)+(RAD(J)-RAD(J-1))*SUB1/SUB2
RI = CUR1(J-1)+(CUR1(J)-CUR1(J-1))*SUB1/SUB2
R2 = CUR2(J-1)+(CUR2(J)-CUR2(J-1))*SUB1/SUB2
R100T = CR10P(J-1)+(DR10P(J)-DR10P(J-1))*SUB1/SUB2
                                                                                                                                                                                                                                                                                                                          R0 = R2 * SN-
R10BT = - ((A**2)*0.5)*(R1*CS)/R0**2
7775 TAN=SN/CS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            IF (KGEBM.EQ.4.8R.KGEBM.EQ.3) GBT8 79
                                                                                                                                                                                                                                                                                                                                                                   IF(TIME.EQ.TIC) RTICK=RØ

JF (NCYC.GT.1) GØ TØ 491

IF (TIME.NE.TIC) GØ TØ 451

RADUS(ITIC) = RØ
                                                                                                                                                                                                                                                                                                                                                                                                                        AMAT(ITIC,1) = SAVY(7)
AMAT(ITIC,2) = SAVY(8)
                                                                                                                                                  SUB2 = PSI(J)-PSI(J-1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                           AMAT(JTIC,3) = SAVY(7)
AMAT(JTIC,4) = SAVY(8)
                                                                                                                                                                                                                                  SØTENSØID GEBMETRY
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            CN=CS*SN
X1CS=1.0/CS
TN=SN/CS
X1RB=1.0/RØ
X1RBSQ=1.0/RØ**2
X1CSRØ=1.0/(CS*RØ)
                                                                                                                                       SUB1 = ARG-PSI(J-1)
               RI = CURILJI
R2 = CUR2(J)
R10ØT = CR1DP(J)
GØ TØ 7775
                                                                                                                                                                                                                                                                                                 R2 = A/DSQRT(SN)
                                                                                                                                                                                                                                                           SN = DSIN(PHI)
CS = DC@S(PHI)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   RBSQ = RB*#2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                SADUS(JTIC)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              CN IRB=CN/RB
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       X1SN=1.0/SN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            SN1RØ≠SN/RØ
                                                                    NERROR = 41
                                                                                               8503 NERRØR = 42
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         CS1RØ=CS/RØ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        CS1R2=CS/R2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XNSQ=XN*#2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             CS1R1=CS/R
                                                                                  60 10 8888
                                                                                                                          GB TØ 8889
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      SNSO=SN**2
                                                                                                                                                                                                                    COTO 7775
                                                                                                                                                                                                                                                CONTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        CONTINUE
                                                                                                             8888 NIX = 1
                                                                                                                                                                                                                                                                                        = 61
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                                                                                     COMPUTATION OF K AND D FOR MATERIAL PROPETY INPUT
                                                                                                                                                                                                                                                                                                       GØ TØ (703,702,701,701), THICK
                                                                                                                                                                                                                                                                                                                                T = ST(3,LL)
RHØC = ST(NCØNT-1,LL)
HI= ST(2,LL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                          RHØI = ST(NCØNT-2,LL
RHØS = ST(NCØNT-1,LL
RHØR = ST(NCØNT,LL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  RHØI = ST(NCØNT-1,LL
RHØS = ST(NCØNT,LL)
                                                                                                                                                                                                                                                                                                                                                                     RHØI = ST(NCBNT, LL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    RWAFI, RWAF2, RWAF3
HB = ST(10, LL)
                                                                                                                                                                                                                                                                                                                                                                                              ST11, ST12, ST13
                                                                                                                                                                                                                                                                                                                                                                                                         HB= ST(14,LL)
                                                                                                                                                                                                                                                                                                                                                                                                                       = ST(13,LL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XIPH= ST(4,LL
                                                                                                                                                                                                                                                                                                                   HØ= ST(4,LL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XITH= ST(9,1
                                                                                                                                                                                                                                                       BARB = C.0
                                                XMTTH=0.0
XMTPH = 0.
                                                                                                                                                                                                                                                                    A = 0.0
                        79, XNTTH=0.
                                                                                                                                                                                                                                                                                                                                                         703
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NTEMP, MTEMP
RANKIN=THINHD MEANS INTERPOLATE, BUT DB NBT COMPUTE NTEMP, MTEMP
                                                                                                                                                                                                                                                                                                                                                                                                STIO,RWAF
RANKIN=THSIND MEANS INTERPOLATE,COMPUTE NTEMP,MTEMP
RANKIN=THTRH MEANS DØ NET INTERPOLATE,DØ NØT CØMPU
RANKIN=THCNST MEANS DØ NØT AVERAGE, BUT INTERPOLATE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            CØNTINUE:
TEMP3= (1.0-XNUPT * XNUTP)
                                                                                                                                                                                                      STINCBNT-1,LL
                                                                                                                                                                              = ST(NCBNT-2,LL
                                                                                STH = SPH
RHØR = RHØS
AA = RHØS*XITH
                                                                                                                                                                                                                                                                                                                              XITH = XIPH
                                                                   XITH= XIPH
                                                                                                                                                                                                                                                                                                                 CTH = CPH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             CONTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         KMERD
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XD11=(XK11* H1*+2)/12.+ H1*( ETHET(1) * 28HIN + ETHET(2) *Z8HBUT)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XD22=(XK22* HI**2)/12.+ HI*( EPHI(1) * ZBHIN + EPHI(2)* ZBHBUT)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1 (2.0*(E1*HI+E2*HB))
ZBRBUT=((E1*HI**2)+(E2*HB**2) +(2.0*E1*HB*HI) +(2.0*E1*HI*T)) /
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             ZBRIN =((E1#HI##2)+(E2#HB##2) +(2.0#E2#HB#HI) +(2.0#E2#HB#T)) /
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  YBARI := 18RIN-H1/2.C
YBARC = 18RIN-H1-T/2.0
YBAR0 = :H1/2.O-18RBUT
ATHR = :(RHØC*T**3+RHØI*2.O*HI**3)/112.O+RHØI*HI*(2BHIN+2BHØUT)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     KD33 = (XGPT(1)*HI**3+XGPT(2)*HØ**3)/12.+HI*(XGPT(1)*28HIN)+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ZBHBUT=(ZBRBUT-HI/2.0)**2
XD33= (HI**3*(XGPT(1)+XGPT(2)))/12.0+ HI*(XGPT(1)* ZBHIN
+ XGPT(2)* ZBHBUT)
                                                        GB TB (42,47,49,41),THICK
GB TB (103,42,103,42,47,49,42,47,49,42,47,49),ISTTAB
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ZBRØUT =-(HI*(E2+3.0*E1)+2.0*E1*T)/(2.0*ES1)
ZBHIN= (ZBRIN-HI/2.0)**2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XK22= EPSUM * HI/PERM
XK33= HI*(XGPT(1)+ XGPT(2))
2BRIN = (HI*(E1+3.0*E2)+2.0*E2+1)/(2.0*ESI)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XXII= (ETHET(I)* HI + ETHET(2)* HØ)/PERH
XX22= (EPHI(I) * HI + EPHI(2) * HØ)/PERH
XX33= XGPI(I)*HI + XGPI(2) * HØ
            E1= (ETHET(1)+ EPHI(1))/2.
E2= (ETHET(2)+ EPHI(2))/2.
ES1= E1+E2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ZBHBUT = (ZBRBUT-HB/2.0)**2
                                                                                                                                                                      XKII= TEMP1/TEMP3
XD11= TEMP2/(12.04 TEMP3)
TEMP1= EPHI(1)4 HI
TEMP2= TEMP14HI**2
                                                                                                                                                                                                                                   XK22= TEMP1/TEMP3
XO22=-TEMP2/(12.0* TEMP3)
                                                                                                                                                                                                                                                                                                                                                                                                                                            ETSUM= ETHET(1)+ ETHET(2)
XK11= ETSUM + HI/PERM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ZBHIN = (ZBRIN-HI/2.0) **2
                                                                                                                                                                                                                                                                                                                                                                                                                             EPSUM= EPHI(1)+ EPHI(2)
                                                                                                                                                                                                                                                                                                                                                 ATHR = RHBI*HI**3/12.0
                                                                                                                                                                                                                                                                                  XD33= XK33*HI**2/12.0
                                                                                                                                        TEMP1= ETHET(1) * HI.
TEMP2= TEMP1.* HI**2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1 (2.0*(E1*HI+E2*HØ))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              UNEQUAL FACE SHEETS
                                                                                                                                                                                                                                                                    XK33= XGPT(1)* HI
                                                                                                           SINGLE SHEET .
                                                                                                                                                                                                                                                                                                                                                                                               EQUAL SHEETS .
                                                                                                                                                                                                                                                                                                                 YBARC = 0.0
                                                                                                                                                                                                                                                                                                                                    YBARG = 0.0
                                                                                                                                                                                                                                                                                                  YBARI .= C.O
PERM ... TEMP3
                                                                                                                                                                                                                                                                                                                                                                GB TB 55
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                                                                 XD22= ( D22 +(HI*EPHI(I)*ZBHIN) + (HØ*EPHI(2)* ZBHØUT)) /PERM
                                   + (HØ*ETHET(2)*ZBHØUT))/PERM
                                                                                                                                                                                       DETERMINE COMPLETE CONSTANTS DEPENDENT ON REINFORCEMENT CLUE
                                                                                                                                    ATHR = (RH8C#1##3+RH8I#(H1##3+H8##3))/12.0+RH8I#(H1#28H1N+
                                                                                                                                                                                                                                                                                                        (ISTTAB.EQ.5.0R.ISTTAB.EQ.8.0R.ISTTAB.EQ.11) HB = HI
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XMBNT = -(D3*YBARI+D4*YBARC+C5*YBARB)*BMEGA*CS
                   + ETHET(2)*HB**3)/12.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            K033= X033 + GJPH/(4.0*SPH)+ GJTH/(4.0*STH)
                                                  022 = (EPHI(1)* HI**3 + EPHI(2)*HØ**3)/12.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ABNE = C3*YBARI+C4*YBARC+C5*YBARB
                                   XD11=(D11+ (HI*ETHET(1)*ZBHIN)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            FIISTTAB .EQ.2)GB TB 103
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            GB TB (58,60,100),KLUE2
                                                                                                    /BARC = ZBRIN-HI-T/2.0
                    (ETHET(1)*HI**3
                                                                                                                 YBARØ = HØ/2.0-ZBRØUT
                                                                                    YBARI = ZBRIN-HI/2.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             - XD22 - EISPH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                            -DD#BMEGA#SN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           EISPH= ES* XIPH/SPH
EISTH= ER* XITH/STH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             - RHØS*RØS*TBARS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             = RHØR*RØR*TBARR
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             = 01+02+03+04+05
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            = C1+C2+C3+C4+C5
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        ST CLUE (11,12,13)
   XGPT(2)*ZBHØUT*HØ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               -X011- E1STH
                                                                                                                                                                                                                                       RØI = RØ-YBARI*SN
RØU = RØ-YBARØ*SN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XK11= XK11+ EASTH
XK22= XK22+ EASPH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             -XUII*XNUIP
                                                                                                                                                                                                                                                                        = RØ-YBARC*SN
                                                                                                                                                  HE*ZBH@UT)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XK12= XK11*XNUTP
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               CC11= EASTH*CTH
                                                                                                                                                                                                                                                                                                                        = RHØ[*RØ]*H
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 C22= EASPH*CPH
                                                                                                                                                                                                                                                                                                                                                        = RHBI*RBU*H
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          TBARR = ATH/STH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              = RHBS*TBARS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ROR = RO-CTH*SN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             = RO-CPH*SN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              = RHOR *TBARR
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             EASTH=ER*ATH/S
                                                                                                                                                                                                                                                                                                                                        = RHØC*RØC*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             EASPH=ES*APH/SI
                                                                                                                                                                                                                                                                                                                                                                                                           = RH0I+H0
                                                                                                                                                                                                                                                                                                                                                                           = RH0 [*H
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x011=
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                                             XPRES = -DD#8MEGA#SN
XM8NI = -{D1*CTH+D2*CPH+D3*YBARI+D4*YBARC+D5*YBAR8)*8MEGA#CS
                                                                                             ABNE = C1*CTH+C2*CPH+C3*YBARI+C4*YBARC+C5*YBARB
GB TB 103
                                                                                                                                                                                                                                                                                                                                                                                                   SN4T02 = 4.*SINB2
XD22 = -XD22-2.0*C0SB**3*EDI-SN4T02*C0SB*GRI
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XC22= EASTH#CTH# (CSB/SNB # ØNEC2B)
XD12=-XD11*XNUTP- EISTH#(SNB*@NEC2B/CSB)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XK12=XK11*XNUTP + (EASTH*SNB*BNEC2B/CSB)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XK12= XK11*XNUTP + (2.0*CØSB*SINB2*ED)
XK22=XK22+(2*CØSB**3*ED)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                1*2*GRI)/ CØSB) + (2.0*CØSB*SINB2*EDI)
XD12 = -XD11*XNUTP-(2.0*CØSB
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      SCB2 = (SNB-CS28*SNB + 2.)/(2.0+CSB)
SN2B = SIN(TBETTA) /2.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XKII=XKII+ EASTH*SCB2
XK22=XK22+ EASTH*(CSB/SNB*ØNEC2B)
XK33=XK33+ EASTH* SN2B
XCII= (EASTH*CTH* SCB2 )
XCIS=EASTH*CTH* SNB* ØNEC2B/CSB )
                                                                                                                                                                                                                                                                                                                                                   GRI= ER* 12/(2.0*(1.0 + XNUTP)*D)
XC11 = CTH*SN2TØ4/C@SB*EC
EDI = ER*XITH/D
                                                                                                                                                                                                                                       ED = ER*ATH/D
SINB2= SINB**2.
HL = 2.0*(ABS(ZETTA)-ABS(CTH))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               xK11=xK11+(SN2TB4+ED/CBSB)
XD11 = -XD11-SN2TB4+EDI/CBSB-(
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              *SINB2*EDI)-(SN4T02*C0S8*GRI)
                                                                                                                                                                                                                                                                                                       XC22 = 2.0*CTH*CØSB**3*ED
XC15 = 2.0*CTH*CØSB*SINB2*ED
XC16 = XC15
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XK-33=XK33+{2*C@SB*SINB2*ED)
                                                                                                                                                                                                                                                                                                                                                                                                                                                 XD33 = XD33+((4.0+CBS(TB)+
                                                                                                                                                                                                                                                                                        [2=[ATH**3.]/(3* HL**2]
                                                                                                                                                                                                           SN2TØ4 = 2*(SINB**4.)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      BNEC28=11.0+ CS28)/2.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     KC16=EASTH#CTH#SN2B
                              DD*BMEGA*CS
   ٠,
                                                                                                                                                                                                                          D= STH*(CBSB+SINB)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      IBETTA= 2.0*BETTA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             SN4TØ2*CØSB*GRI)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      CS28= CØSTTBETTA
                                                                                                                                                         CONTINUE
SINB =SIN(BETTA)
COSB =COS(BETTA)
                                                                                                                             RWA CLUE (1,2,3)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1SG CLUE (1,2,3)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        SNB =SIN(BETTA)
CSB =C0S(BETTA)
                                                                                                                                                                                                                                                                                                                                                                                                                                 18= 2.0* BETTA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             xD21 = xD12
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                                                                                                                    XMONT = -(D1+CTH+D3+YBARI+D4+YBARC+D5+YBARB)+BMEGA+CS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     TEMP6 + (TEMP61 + TEMP62)
TEMP5 + (TEMP71- TEMP72)
TEMP5 + (TEMP71 - TEMP72)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  TEMP8*TEMP61 + ETHK2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           TEMP8*TEMP61 + EPHK2
                                                                                                                                                                                                                                       IF(ISTAB.NE.1.AND.ISTAB.NE.3) ATMD=AA+ATHR
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          TI = {HI*(E2-E1)+2.0*E2*T)/(2.0*(E1+E2))*
TØ = (HI*(E1-E2)+2.0*E1*T)/(2.0*(E1+E2))
                                                                                                                                               ABNE = C1*CTH+C3*YBARI+C4*YBARC+C5*YBARB
                                                                                                                                                                                                                                                                                                                                                                                                                  TEMP21= ALPHPH(1)+ XNUTP * ALPHPH(2)
TEMP22= ALPHPH(1)+ XNUPT * ALPHTH(1)
TEMP3 = 1-XNUPT*XNUTP
TEMP4 = H1/4.0
XD11=-XD11- E1STH*SCB2
XD22 = -XD22-EISTH* (CSB/SNB*@NEC2B)
XD33 = XD33+ EISTH*SN2B
XK21 = XK12
XD21 = XD12
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         TEMP61= TITH TIK-2* TEFREE
TEMP62= T00+ T0K-2* TEFREE
TEMP71= 2,0* TII +TIK-3*TEFREE
TEMP72= 2,0* T00 +T0K-3*TEFREE
                                                                                                                                                                                                                                                                GØ TØ (716,714,715,714),KELVIN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ETHK1= ETHET(1)*TEMP11/TEMP3
TEMP5 = H1**2/24.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ETHK2 = ETHET(2) *TEMP12/TEMP3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       GØ TØ (811,812,813,814),THICK
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         EPH1(2) *TEMP22/TEMP3
                                                                                           XMERD = (DD-D2)*ØMEGA*CS
XPRES = -(DD-D2)*ØMEGA*SN
                                                                                                                                                                                    IF (KGEBM,NE.4) GB TB 105
XMERD = C.0
XMBNT = 0.0
                                                                                                                                                                                                                                                                                                    TOK = STINROW+3,LL)
TOO = STINROW+4,LL)
                                                                                                                                                                                                                                                                              ST (NROW+1, LL)
                                                                                                                                                                                                                                                                                          ST (NRØM+2,LL)
                                                                                                                                                                                                                                                                                                                                            TII = ST(NRØW+1,LL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ITEMP62
XNTPH = EPHK1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     TEMP8= H1/2.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XNTTH = ETHK1
                                                                                                                                   AZERØ = CC-C2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XMTTH= ETHKI
XMTPH= EPHKI
GB TB 714
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XNTTH= ETHK1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XNTPH= EPHK
                                                                                                                                                                                                                                                                                                                                                                                  T00 = TI
                                                                                                                                                                                                                           CONTINUE
                                                                                                                                                                        CONTINUE
                                                                                                                                                                                                                                                                                                                               GØTØ 717
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               EPHK1 =
                                                                                                                                                                                                                                                                                                                                                                                                           717
                                                                                            108
                                                                                                                                                                        103
                                                                                                                                                                                                                                                                            716
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                                                                                                                                                                                                                                              505730
XMTTH =(ETHK1 * TEMP8 * (HI*TEMP71/3.0+ TI*TEMP61)) - (ETHK2 *
                                                                                                                                                                                                                       XMTPH = EPHK1+0.5+(H1++2+TEMP71/3.0+TI+HI+TEMP61)-EPHK2+0.5+(HB
                   I.TEMP8*(HI*TEMP72/3.0+TØ*TEMP62))
XMTPH =[EPHK] * TEMP8 * (HI*TEMP71/3.0+ TI*TEMP61)) - (EPHK2 *
                                                                                                                                                                                  KMTTH = ETHK1*0.5*(H1**2*TEMP71/3.0+TI*HI*TEMP61)-ETHK2*0.5*(HB
                                                                                                                                                                                                                                                                                                                                            * TEMP62
                                                                                                  II = (E2*HB**2-E1*HI**2+2.0*E2*HB*T)/(2.0*(E1*HI+E2*HB))
IB = (E1*HI**2-E2*HB**2+2.0*E1*HI*T)/(2.0*(E1*HI+E2*HB))
                                                                                                                                        XNTTH = 'ETHK1*0.5*(HI*TEMP61)+ETHK2*0.5*(HØ*TEMP62)
XNTPH= EPHK1*0.5*(HI*TEMP61)+ EPHK2*0.5*(HØ*TEMP62)
                                                                                                                                                                                                                                                                                    IEMP10=((-XK11*XD11)**.5)/(48.0**.5)
                                                           1 TEMP8*(HI#TEMP72/3.0+TØ*TEMP62))
                                                                                                                                                                                                                                                                                                        [EM1] = ((-XK22*XD22)**.5)/(48.0**
                                                                                                                                                                                                                                            1 ** 2 * TEMP 72/3 . + TØ * HØ * TEMP 62)
                                                                                                                                                                                                      **2*TEMP72/3.+TØ*HØ*TEMP62)
                                                                                                                                                                                                                                                                                                                           XNTTH = (XK11/4.0
                                                                                GØ TØ 714
                                                                                                                                                                                                                                                                 60 10 714
                                                                                                                                                                                                                                                                                                                                                                                                        CONTINUE
                                                                                                                                                                                                                                                                                                                                                                 XMTTH =
                                                                                                                                                                                                                                                                                                                                                                                     *MTPH =
                                                                                                                                                                                                                                                                                                                                                                                                                           RETURN
                                                                                                                                                                                                                                                                                                                                              XNTPH
                                                                                                   813
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         THEN USE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        USE SPLICØ TØ REPRESENT RI(!) AS A FUNCTIØN: ØF SØUT(!). THEN US
SPLINE TØ INTERPØLATE RACD AND CØRRESPØNDING DERIVATIVES. FRØM
THESE, CØMPUTE THE TWØ PRINCIPAL RADI! ØF CURVATURE,
                                                                                                                 INTERSECTION OF THE CORRESPONDING RILL) AND
                                                                                                                                                                                                                                                                                                                                                                PASS SPLINE CURVE THRØUGH INPUT PØINTS ØN SHELL MERIDIAN, AND
                                THIS SUBROUTINE CALCULATES THE GEOMETRY FOR A SHELL SEGMENT.

THE INPUT VARIABLES ARE . . .

RI(1) - - DISTANCE FROM AXIS OF REV. TO POINTS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           COMPUTE MERIDIONAL ARC LENGTH TO INTERPOLATED POINTS BY NUMERICAL INTEGRATION (SIMPSENS RULE). SINCE SIMPSENS RULE REQUIRES AN EVEN NUMBER OF PARTITIONS, INTERPOLATE A POINT MIDWAY BETWEEN EACH PAIR OF POINTS USING SUBROUTINE SPLINE.
                                                                                                                                                                               COMMON /SPLINS/ ANG.PSI(100),RAD(100),CURI(100),CURZ(100), ORIDP(100),ZI(14),RI(14),NRZIN DIMENSION CI(4,13),DRDZ(14),SOUT(14),S(101),RADD(100)
                                                                                                                                                NUMBER OF (RI,ZI) PAIRS READ AS INPUT.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         CALL PLINE (ZI,RI,NRZIN,CI,ZI(I)+DZZ,FAKE1,DRDZM,FAKE2)
SØUT(I+1) = SØUT(I) + DZ6*(FUN(DRDZ(I)) + 4.0*FUN(DRDZM)
FUN(DRDZ(I+1)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     $(1) = FLBAT(1-1)*BLDH1

CALL PLINE ($BUT,RI,NRZIN,CI,$(I),RAD(I),RADD(I),RADD2)

IF (ABS(RADD(I),GI,L,0) RADD(I)=1.0

FCTRR = $CRTI(L,0-RADD(I)**2)

CURI(I) = -RADD2/FACTØR
                                                                                  BN SHELL MERIDIAN.
- DISTANCE ALBNG AXIS BF REV. TB. THE
                                                                                                                                                                                                                                                                                                                                                                                                                                                             CALL PLINE (ZI,RI,NRZIN,CI,ZI(I),FAKEI,DRDZ(I),FAKEZ)
                                                                                                                                THE AXIS BF REV.
                                                                                                                                                                                                                                                                                                                                                                                 COMPUTE CRIDZ AT THESE PRINTS.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      CALL PLICE (SBUT, RI, NRZIN, CI)
                                                                                                                                                                                                                                                  FUN(ARG) = SQRT(1.0 + ARG**2)
                                                                                                                                                                                                                                                                                                                                                                                                                CALL PLICE (ZI,RI,NRZIN,CI)
                                                                                                                                                                                                                                                                                                                                 IF (ANG.EQ.B) AMULT = -1.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        BLDH1 = SBUT(NRZIN) /99.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          DØ 70 I=1,NDELZ
DZ2=(Z[(I+1)-Z[(I))/2.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    CURZ(I) = FACTØR/RAD(I)
                                                                                                                                                                                                                                                                                 RAES = 3.1415926/18C.0
FBR, IS GEBMET, GEBMET SUBRBUTINE GEBMET
                                                                                                                                                                                                                                                                                                                                                                                                                               NDELZ = NRZIN - 1
                                                                                                   - (1)17
                                                                                                                                                   NRZIN -
                                                                                                                                                                                                                                                                                                                                                                                                                                             DØ 60 I=1,NR2IN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = 1/R1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            SBUT(1) = 0.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           026=022/3.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       00 110 I=1
                                                                                                                                                                                                                                                                                                DATA B/-B
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         CONTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              CONTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       CONTINUE
                                                                                                                                                                                                                                                                                                                AMULT =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        CURI
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       CUR2
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                                                                                                                                                                    IF (ANG.EQ.B) GØ TØ 190
ORIOP(J-1) = (CURI(J)-CURI(J-I))/(PSI(J)-PSI(J-I))
                                                                                                                                                                                             GB TB 180
DR1DP(J-1) = (CUR1(J-1)-CUR1(J))/(PSI(J-1)-PSI(J))
         CBSPSI = AMULT4RADO(J)
PSI(J) = ARCBS(CBSPSI)
SINPSI = -AMULT4RAD(J)*CUR2(J)
IF (ANG.EQ.B) GB TB 179
PSI(J) = 2.0*3.1415926-PSI(J)
                                                                                                                                                                                                                              DRIDP(100) = DRIDP(99)
DØ 42 J=1,100
DRIDP(J) = DRIDP(J)*0.1
2 C@NTINUE
RETURN
ENG
                                                                                       CURI(J) = -AMULT/CURI(J)
CUR2(J) = -AMULT/CUR2(J)
IF (J.EQ.1) GØ TØ 180
                                                                                                                                          IF (J.EQ.2) GØ TØ 181
                                                                                                                                                                                                                       CONTINUE
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FOR, IS PLINE, PLINE (X,Y,M,C,XINT,YINT,DYDX,DZYDXZ)
SUBROUTINE PLINE FOR SPLINE FIT INTERPOLATION IN THE TABLE OF VALUES
(X1,Y1) TO (XM,YM), WHERE M MAY BE AS LARGE AS 100, WHERE THE '
CONSTANTS C(1,K),C(2,K),C(3,K) AND C(4,K) ARE ALREADY COMPUTED
AND STORED.
                                                                                                                                                                                                                                                                                                                 vint = vint + (xint-x(k)) + (C(2,k) + (xint-x(k)) + +2 + C(4,k))
70 \text{ DYDX} = -3.0 + (C(1,k) + (x(k+1)-xint) + +2 - C(2,k) + (xint-x(k)) + +2)
                                                                                                                                                                                                                                                                                                     60 YINT = (X(K+1) - XINT)*(C(1,K)*(X(K+1)-XINT)**2+C(3,K))
                                                                                                                                                                                                                                                                                                                                                                    D2YDX2=6.0*(C(1,K)*(X(K+1)-XINT)+C(2,K)*(XINT-X(K)))
                                                                                             SUBRBUTINE ALSØ CØMPUTES DY/DX AND DZY/DXZ AT XINT. DIMENSIØN X(14),Y(14),C(4,13) (F (XINT-X(1)) 80,10,20 YINT = Y(1)
                                                                                                                                                                                                                                                                                                                                                                                                     WRITE (6,90)
FORMAT (31H BUT OF RANGE FOR INTERPOLATION)
                                                                                                                                                                                                    20 K = 1
30 IF (XINT-X(K+1)) 60,40,50
                                                                                                                                                                                                                                                                                                                                                      -C(3,K)+C(4,K)
                                                                                                                                                                                                                                                                                     IF (M-K) 80,80,30
                                                                                                                                                                                                                                    40 YINT = Y(K+1)
                                                                                                                                                                                    GØ TØ 70
                                                                                                                                                                                                                                                     GØ TØ 7C
                                                                                                                                                                                                                                                                                                                                                                                       RETURN
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                    SUBRBUTINE TO DETERMINE C(1,K),C(2,K),C(3,K) AND C(4,K).
SUBRBUTINE TO DETERMINE C(1,K),C(2,K),C(3,K) AND C(4,K).
DIMENSION X(14),Y(14),A(14,3),B(14),Z(14)

DIMENSION X(14),Y(14),A(14,3),B(14),Z(14)

HM = H-1

DE 10 K=1,MM

DK > X(K+1) - X(K)

P(K) = D(K)/6.0

10 E(K) = (Y(K+1)-Y(K))/D(K)

DE 20 K=2,MM

20 B(K) = E(K) - E(K-1)

A(1,2) = -1.0-D(1)/D(2)

A(1,3) = D(1)/D(2)

A(1,3) = D(1)/D(2)

A(1,3) = Z(1)/D(2)

A(2,3) = P(2)-P(1)+A(1,2)

A(2,3) = Z(1)+P(1)+P(2)

A(2,2) - Z(1)+P(2)

A(2,2) - 
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     A(K_2) = 2.0 + (P(K-1) + P(K)) - P(K-1) + A(K-1,3)

B(K) = B(K) - P(K-1) + B(K-1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           Q = 1.0/(6.0*D(K))

C(1,K) = Z(K)*Q

C(2,K) = Z(K+1)*Q

C(3,K) = Y(K)/D(K)-Z(K)*P(K)

O C(4,K) = Y(K+1)/D(K)-Z(K+1)*P(K)

END
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Z(K) = B(K)-A(K,3)*Z(K+1)

Z(1) = -A(1,2)*Z(2)-A(1,3)*Z(3)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                A(M_1) = 1.0+Q+A(M-2,3)

A(M_2) = -Q-A(M,1)+A(M-1,3)

B(M) = B(M-2)-A(M,1)+B(M-1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             A(2,3) = A(2,3)/A(2,2)
B(2) = B(2)/A(2,2)
DØ 30 K=3,MM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               A(K,3) = P(K)/A(K,2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         B(K) = B(K)/A(K,2)

Q = D(M-2)/D(M-1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Z(M) = B(M)/A(M,2)
MN = M-2
DØ 40 I=1,MN
FOR, IS PLICE, PLICE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   DØ 50 K=1,MM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1-1 ×
                                                                                                                                                                                                                                                                                                                       70
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SUBROUTINES DIF1 AND DIFF2

These subroutines are called in RIEMAN as necessary. DIF1 contains the differential equations for the THIC and ST clues, while DIFF2 contains the differential equations for the RWA and ISG clues. Geometry clues, trigonometric values and predicted values of the differential equation variables are passed via label common area, EQUAZN, to subroutines DIF1 or DIFF2. The coefficients for the mass and load terms, X1, X2, X3, and K are identified depending upon the pass number and convergence criterion.

The specific derivative equations and auxiliary equations are contained in these subroutines. The values of each derivative equation, YDOT, and each auxiliary equation, YA ---, are returned to RIEMAN via label common EQUAZN.

A special equation counter, I, is used in these subroutines, which counts in increments of eight. The first eight values of I, I through 57 (in increments of eight), correspond to the eight sets of initial conditions required to compute the segment stiffness matrices in subroutine SEGMAT. The subsequent values of I, 65 and 73 maximum (again in increments of eight) correspond to the computation of each set of eight equations for each loading condition (two conditions corresponding to rotation and static prestress respectively).

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ENGINEERING SYMBOLS (REF. 1)

XN

YDOT
$$(I + 1)$$

YDOT
$$(I + 4)$$

YPRED (I)

YPRED
$$(I + 1)$$

YPRED
$$(I + 2)$$

YPRED
$$(I + 3)$$

YPRED
$$(I + 4)$$

YPRED
$$(I + 5)$$

YPRED
$$(1 + 6)$$

YPRED
$$(I + 7)$$

YAMPT

YANTH

YAMTH

n

$$\Phi_{\phi}$$

$$\frac{dN_{\phi}}{ds}$$

$$J_{\dot{\phi}}$$
, ϕ

$$\frac{\mathrm{dM}_{\phi}}{\mathrm{ds}}$$

$$\frac{\mathrm{d} \mathrm{U}}{\mathrm{d} \mathrm{s}}$$

$$\frac{dV}{ds}$$

$$\frac{\mathrm{d} W}{\mathrm{d} s}$$

$$\Omega_{oldsymbol{\phi}}$$
 , ϕ

$$\frac{ds}{d\Omega}$$

$${\rm T}_{\varphi\theta}$$

$$^{\mathrm{N}}_{\mathrm{\Phi}}$$

$$J_{\varphi}$$

$$M_{\phi}$$

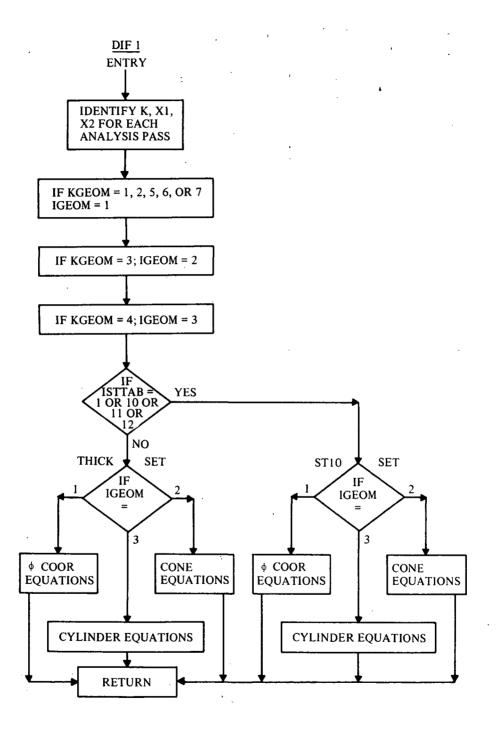
$$\Omega_{\Theta}$$

$$^{\rm H}$$

$$^{\mathrm{M}}$$
 $_{\mathrm{\Theta}}$

| FORTRAN CODE | ENGINEERING SYMBOLS (REF. 1) |
|------------------|---|
| R2SQ | r ₂ |
| ROSQ | r_0^2 |
| X1RO | 1/r ₀ |
| S | s' · · · · · · · · · · · · · · · · · · · |
| XK12 | K ₁₂ |
| XK21 | K ₂₁ |
| XD12 | D ₁₂ . |
| XD21 | D ₂₁ |
| XCll | c _{ll} |
| XC22 | C ₂₂ |
| XNSQ | n ² |
| Non-Linear Redef | initions (Ref. 1) |
| YDOT (I+2) | * $J_{\phi,\phi}$ $\frac{d*J_{\phi}}{ds}$ |
| YPRED (I+2) | *j |
| YAJPH | J_{ϕ} |
| XNL | <u>a</u> |

XNPHI



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500010
                                                                                       500030
                                                                                                                      500040
                                                                                                                                                  500050
                                                                                                                                                                                                                                          500080
                                                                                                                                                                                                                                                                      500090
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                                                                                                              DØUBLE PRECISION SAVTIC,TIC,PHI,STØP,RESTØP,RTICK
DØUBLE PRECISION YPRED
UØUBLE PRECISION YD01,YASAVE,YANTH,YAMPT,YAJPH,S,SN,CS,SNSQ,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             11
                                                                                                                                                                                                     CSSQ.TAN, SEC, CN, XICS, XISN, TN, XIRØ, XIRØSO, XISNRØ, XICSRØ, CNIRØ, SNIRØ, CSIRØ, XIRI, XIR2, CSIRI, CSIRZ,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                            COMMON NST(30),NKL(30),NXMAT(20),SAVJTC(30),SAVSTP(30),JRTIC(30)
COMMON JRSTOP(30),NREG,NMPT,NRC,NSC,NIX,IERROR,KGEOM,IGEOM,ISTTAB
COMMON KELVIN,IBEGIN,NPROB,NSEG,NERROR,Q,THICK,NOJS,NLINKS,NLCASE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   GØ TØ (151,152,153); IGEBM
EQUATIONS FOR SHELLS OF REVOLUTION ( PHI COORDINATE )
I YANTH = XNUPT*YPRED(I+1)+(XXI1-XNUPT**2*XX22*XX21.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XMTHLD, XMPHLD, ETHET(2), EPHI(2), XGPT(2), ALPHTH(2), ALPHPH(2), DUM, XNUTP, XNUTP, XC11, XC22, XC15, XD33, XD22, XD21, XD12,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XNUPT*YPRED(I+3)-(XD11-XNUPT**2*XD22)*XLRB*(X1RB*(XN*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XIRB,XIRBSQ,XISNRB,XICSRB,CNIRB,SNIRB,CSIRB,
XIRI,XIR2,CSIRI,CSIR2,SNIRI,XIRISQ,R2SQ,RB,BESQ,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       (KGEBM.EQ.1.BR.KGEBM.EQ.2.BR.KGEBM.EQ.5.BR.KGEBM.EQ.6) IGEBM
                                                                                                                                                                                                                                                                 SNIR1, XIR15Q, R25Q, RØ, BESQ, RØSQ, XNSQ, R1, R2, S1,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            (-1.0/((R0/X033)+(SNSQ*XIR0/XK33)))*(-2.0*XN*
YPRED(1+7)+YPRED(1+4)*(CSIR1-CNIR6)+XN*YPRED(1+5)*
                                                                                                                                                                                                                                                                                       RIDGI, XNITH, XNTPH, XMTTH, XMTPH, XC11, XC22, XC15,
                                                                                                                                                                                                                                                                                                                            XD33,XD22,XD21,XD12,XK11,XK12,XK21,XK22,XK33,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      /PRED([+5)*CS-YPRED([+6)*SN)*X1RB+K*(XNUPT*XNTPH-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             KNTIH, XNIPH, XMTIH, XMTPH, XFIHLD, XFPHLD, XFZELD,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        SNIR@+XIRI)+2.0*XN*YPRED(I+6)*CSIR@+YPRED(I)*SN/
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        PRED(I+4)*SN-XNSC*YPRED(I+6))+YPRED(I+7)*CS)+K*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              N XNPHI,M.I.BETTA,ZETTA,SAVY(B),XCI6
CUMMUN /PLS/ UMEGA,IMURD,XMERD,XPRES,XMUNI,AZERU,ADNE,ATWU
EQUIVALENCE (XNL(I),XI),(XNL(2),X2),(XNL(3),X3)
IF (NH.NE.O) WRITE(6,1333) PHI,SAVY
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           S, SN, CS, SNSQ, CSSQ, TAN, SEC, CN, X1CS, X1SN, TN,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                YPRED(I+2)-YPRED(I+1)*(X1*SAVY(3)+X2*SAVY(6))
                                                                                                                                                                                                                                                                                                                                                                                          STBRY(16), XMAT(110,10), STD(10), SADUS(30), RADUS(30)
                                                                                                                                                                                                                                                                                                                                                                                                                                                   COMMON XN, TEFREE, TIC, PHI, STØP, RESTØP, RTICK, GI, XNL(3), NH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    NTSKL, NZ, NBC T, LI NPUT, NIRKL, NPASS, XNI, KBC, NRINGS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    KK33+SN*YABPH*(X1*SAVY(3)+X2*SAVY(6)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XN*YPRED(I+6)*XIR@-YPRED(I+4)*SNIRØ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             -YPRED(I+7)*(XI*SAVY(2)+X2*SAVY(5))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                YPRED(80), YDØT(80), YASAVE(80),
              SUBRBUTINE DIFL (XFPHLL, XFZELL, XFPHL2, XFZEL2)
INTEGER SAVJTG, SAVSTP, Q, THICK
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XK11, XK12, XK21, XK22, XK33, XDI
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    IF(ISTTAB.EG.1) GD TD 7786
IF(ISTTAB.GE.10)GD TD 7786
THE FOLLOWING EQUATIONS ARE THE -THICK- SET
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            YANTH, YAMTH, YAMPT, YAJPH
                                                                                                                                                                                                                                                                                                                                                                                                                       CEMMEN TADUS (30), UADUS (30), SAVTIC (900)
                                                                                                                                                                                                                                                                                                                                                              XD11, XNPHI, BETA, XC16
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                RØSG, XNSQ, BETA, RI, R2, S1, R1D0T,
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XNUPT*XMTPH-XMTTH)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            FORMAT(1x, 1P1E16.7, 5x, 1P6E16.7)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               IF ( KGEBM.EQ.7 ) IGEBM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      IF (KGEDM.EQ.3) IGEBM=2
IF(KGEDM.EQ.4) IGEBM=3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                /EGUAZN/
                                                                                       INTEGER XN.1, XN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             F (NH.EQ.0) K
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DIFL, DIFL
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   K#(XMITH-XNUPT*XMIPH)
YA@PH = XN*YPRED(1+6)*XLCS/S-YPRED(1+4)*TAN/S
YAMPT=(-1.0/((S*CS/XD33)+(SN*TN/(XK33*S))))*(-2.0*XN*YPRED(1+7)-
YPRED(1+4)*SN/S+XN*YPRED(1+5)*TN/S+2.0*XN*YPRED(1+6)/S+YPRED
     RI#(YPRED(I+4)*CSIRB+XN*YPRED(I+5)*X1RB+YPRED(I)/XK33+
                                                                                                                                                                                                                                                                                                                                                                                                                                                 -RI*((EPSITH+EPSIPH)*(X1*XFPHL1+X2*XFPHL2)-YPRED(I+7)*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      -R1*X3*@MEGA*(AZER@*YPRED(I+6)-XN/R@*(A@NE*YPREU(I+4)-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         =-2.0*YPRED(I)/S+XN*YANTH*XICS/S-XN*YAMTH*SN*XICS*#2/S*#2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       [AN/S*(YABPH*(X]*SAVY(])+X2*SAVY(4))-YANPT*(X]*SAVY(3)
                                                                                XIROSQ-YAMPT*CSIRO*(XIRI-SNIRO))-RI*K*(XFTHLD+XMPHLD*
                                                                                                                                                                                                                                                                                                                                     XIR1*(YOBT(I+5)-YPRED(I+6))+YPRED(I+7)*(X1*SAVY(3)+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XF2EL1+X2*XF2EL2)+YPRED(I+7)*(X1*XFPHL1+X2*XFPHL2))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  +YAMPT*TAN/S**2-K*(XFTHLD+X#PHLD*TAN/S)-(YOGT(I+4)*
                                                                                                                                  (XI*XFZELI+X2*XFZEL2))-RI*SNIRØ*(YAØPH*(XI*SAVY(1)+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            (1.0/(XK22-XNUTP**2*XK11))*(YPRED(I+1)-XNUTP*YANTH+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          YDØT([+4)=(].0/S)*(YPRED(]+4)+XN*YPRED(]+5)*XLCS+YAMPT*TN/XK33)
                                                       RI*(-2.C*YPRED(I)*CSIRB+XN*YANTH*XIRB-XN*YAMTH*SN*
                              YAMPT*SNIRB/XK33)+R1*YABPH*(X1*SAVY(3)+X2*SAVY(6))
                                                                                                                                                                                                                                                                                                                                                                                                                           YAMPT#(SN*X1R0+X1R1))+YPRED(I+2)*X1R1)-R1*K*XFPHLD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       K+(XNTPH-XNUTP*XNTTH))-YPRED(I+7)*(X1*SAVY(3)+X2*
                                                                                                           SN1R8)-(Y00T(I+4)*(X1*XFPHL1+X2*XFPHL2)+R1*YABPH*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      -RI+XIR&*XN*(YANPT*(X1*SAVY(3)+X2*SAVY(6))-YA@PH*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   R1*(YPRED(I+7)-YPRED(I+5)*XIR1)
R1*(1.0/(XD22-XNUTP**2*XD11))*(-YPRED(I+3)*XNUTP*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               RI*(-YPRED(I+2)*CSIRD-YANTH*SNIRD-YPRED(I+1)*XIRI
                                                                                                                                                                                    -R1*X3*BMEGA*(AZERB*YPRED(1+4)-ABNE*YABPH+SN/RB
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           +XNSQ*YAMTH*X1RBSQ-2.0*XN*YAMPT*CS*X1RBSQ)+R1*K*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    (XN*XMPHLD*X1RØ-XFZELD)-R1*((EPSITH+EPSIPH)*(X1*
                                                                                                                                                                                                                                                                                                                 XIRØ#(XN*YPRED(I+4)+YPRED(I+5)#CS-YPRED(I+6)#SN)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               +RI * X3 * ( @MEGA * ( ABNE * YPRED ( I + 5) + ATWB * YPRED ( I + 7) ) )
                                                                                                                                                                                                                                         RI*(YPRED(I+6)*X1RI+(I.0/(XK22-XNUTP**2*XKII))*
                                                                                                                                                                                                                                                             (YPRED(I+1)-XNUTP*YANTH+K*(XNTPH-XNUTP*XNTTH)))
                                                                                                                                                                                                                                                                                                                                                                                                  RI*(CSIRØ*(YANTH-YPRED(I+1))-XN*XIRØ*(YPRED(I)+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        -R1 * X 3 * BMEGA * (A 2 ER B * Y PR ED ( I + 5 ) + A BNE * Y PR ED ( I + 7 ) )
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   . (I) *SN/ XK33+SN*YAØPH*(X1*SAVY(3)+X2*SAVY(6)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            = YPRED(1+2)-YPRED(1+1)*(X1*SAVY(3)+X2*SAVY(6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         (1.0/(S*CS))*(XN*YPRED(I+4)+CS*YPRED(I+5)-SN*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            -X3+BMEGA+(AZER0+YPRED(I+4)-ABNE+YABPH+TN/S+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                +YPREU(1)/XK33+YA@PH*(X1*SAVY(3)+X2*SAVY(6))
                                                                                                                                                             X2*SAVY(4))-YANPT*(X1*SAVY(3)+X2*SAVY(6)))
                                                                                                                                                                                                                                                                                           -R1 &YPRED(1+7) & (X1 * SAVY(3) + X2 * SAVY(6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     -YPRED([+7)*(X]*SAVY(2)+X2*SAVY(5))
                                                                                                                                                                                                             (ABNE*YPRED(1+4)-ATWB*YABPH))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     (ABNE *YPRED(I+4)-ATWB*YABPH))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          YAMTH-K* (XMTPH-XNUTP *XMTTH))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               (X1 * SAVY.(1) + X2 * SAVY (4))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                               = YPRED(1)+YAMPT*TAN/S
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      YAJPH+K *XMTHLD)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   +X2#SAVY(6))
                                                                                                                                                                                                                                                                                                                                                                         X2*SAVY (6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ATW@#YA@PH)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   SAVY (61)
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YOUT([+4)
                                                                                                                                                                                                                                                                                                                                                                                             YDØT(I+1)
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 YUET(1+7)
                                                                                                                                                                                                                                      YDØT([+5)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           YDØT(I+5)
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                                                  YDØT(I)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    YDØT(1)
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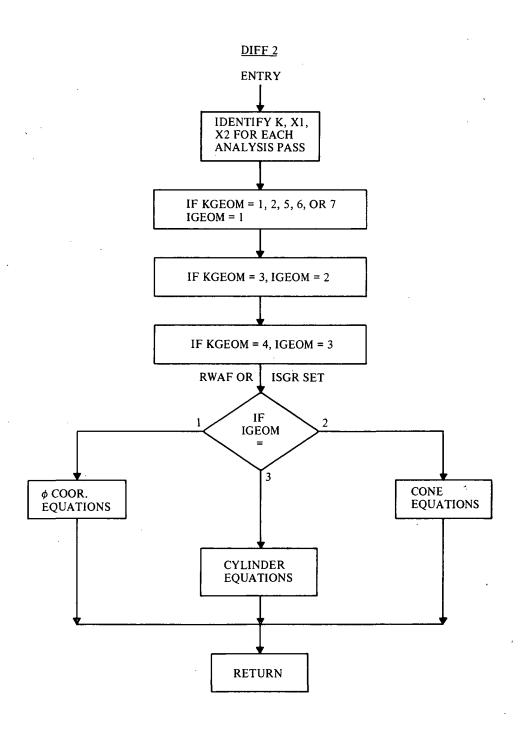
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       YAMTH=XNUPT+YPRED(I+3)-(X1R8+(XD11-XNUPT++2+XD22))+(X1RB+(XN+YPRED
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1 + SAVY(3) + X2 + SAVY(6)) - YABPH+(X1 + SAVY(1) + X2 + SAVY(4)))
                                                                                                                                                                                                                                                                                                               -X3*BMEGA*(AZERB*YPRED(I+6)-XN/(S*CS)*!ABNE*YPRED(I+4)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                X2*XFZEL2))-X1RB*(YABPH*(X1*SAVY(1)+X2*SAVY(4))-YANPT*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        YA&PH = XIR@*(XN*YPRED(1+6)-YPRED(1+4))
YAMPT=(-1.0/((R@/XD33)+(XIR@/XK33)))*(-2.0*XN*YPRED(1+7)+XN*XIR@*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              YANTH=XNUPT*YPRED(1+1)+(XK11-XNUPT**2*XK22)*(X1RØ*(XN*YPRED(1+4)-
                                                                                                                                                                                                                                                                                                                                                                          YOUT(I+3)= YAMTH/S-YPRED(I+3)/S-2.0*XN*YAMPT/(S*CS)+YAJPH+XMTHLD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 -XN*X1R&*YPRED(1)-XN*YAMPT*X1R&SQ-K*XFPHLD-(EPS1TH+
-EPS1PH)*(X1*XFPHL1+X2*XFPHL2)+YPRED(1+7)*(X1*XFZEL1+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    YORT([+7] = (1.0/(XD22-XNUTP*2*XD11))*(-YPRED(1+3)+XNUTP*YAMTH+
                                                              (S**2*CS**2)-K*XFPHLD-(EPSITH+EPSIPH)*(X1*XFPHL1+X2*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XN+YANTH+X1RB-XN+YAMTH+X1RBSQ-K+(XFTHLD+XMPHLD+X1RB)
                                YD01{1+1}= -YPRED(1+1)/S+YANTH/S-XN*YPRED(1)/(S*CS)-XN*YAMPT+SN/
                                                                                                                                                                                                                                                   (X1 *XFPHL1+X2 *XFPHL2)-X1CS/S*XN*(YANPT*(X1 *SAVY(3)+
                                                                                                                                                                                     -2.0*XN*YAMPI/(S**2*CS)+K*(XN*XMPHLD*XICS/S-XFZELD)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     -(YD@T(]+4)+(X]*XFPHL]+X2*XFPHL2)+YA@PH*(X]*XFZEL]+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       -(EPSITH+EPSIPH)*(X1*XF2EL1+X2*XFZEL2)-YPRED(I+7)*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    YOBI(I+7)=(1.0/(XD22-XNUTP**2*XD11))*(-YPRED(I+3)+XNUTP*YAMTH-
K*(XMTPH-XNUTP*XMTTH))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  -x3+BMEGA+(AZERB+YPRED(I+6)-XN/RB+(ABNE+YPRED(I+4)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    K#(XNIPH-XNUIP#XNITH))-YPRED(I+7)#(XI#SAVY(3)+X2#
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          PRED(I+T)+(XI+XFPHLI+X2+XFPHL2)-XIRØ+XN+(YANPT+
                                                                                                                                                          -YPRED(1+2)/S-YANTH*TAN/S+XNSQ*YAMTH/(S**2*CS**2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        -YANTH+X1RB+XNSQ+YAMTH+X1RBSQ+K+(XN+XMPHLD+X1RB-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            YD0T[1+4)=XN*YPRED(1+5)*X1RB+YPRED(1)/XK33+YAMPT*X1RB/XK33
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              .X3+BMEGA+(AZERB*YPRED(I+4)-ABNE*YABPH+1.0/R8+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         (FZELO) - (EPSITH+EPSIPH) + (XI * XFZELI + X2 * XFZEL2) -
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    /PRED(I+5)+YPRED(I)/XK33+YABPH*(X1*SAVY(3)+X2*
                                                                                                                                                                                                                                                                                                                                                                                                                                         +X3+(BMEGA+(ABNE+YPRED(I+5)+ATWB+YPRED(I+7)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           (I+4)-XNSQ*YPRED(I+6)))+K*(XNUPI*XMIPH-XMITH)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            +X3+(BMEGA+(ABNE+YPRED(I+5)+ATWØ+YPRED(I+7)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  YPRED(1+2)-YPRED(1+1)*(X1*SAVY(3)+X2*SAVY(6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    YDØT(1+5)+YPRED(1+7)*(X1*SAVY(3)+X2*SAVY(6))
                                                                                                                         -X3*BMEGA*(AZERB*YPRED(I+5)+ABNE*YPRED(I+7))
  = YDØT([+5)+YPRED([+7)*(X]*SAVY(3)+X2*SAVY(6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           -X3 # BMEGA # ( AZER B * YPRED ( I + S) + ABNE # YPRED ( I + 7) )
                                                                                                                                                                                                                                                                                 (2*SAVY (6))-YABPH*(X1*SAVY (1)+X2*SAVY (4)))
                                                                                            XFPHL2)+YPRED(I+7)*(X]*XFZEL1+X2*XFZEL2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                -YPRED(1+7) * (X1 *SAVY(2) +X2 * SAVY(5))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         YPRED(1+6)))+K*(XNUPT*XNTPH-XNTTH)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 -2.0*XN*YAMPT*X1RB+YAJPH+K*XMTHLD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      X1R0+(XN*YPRED(1+4)-YPRED(1+6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         +YABPH# (X1 #SAVY (3) +X2#SAVY (6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ABNE TYPRED (I+4)-ATMO TYABPH))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      [X]#SAVY(3)+X2#SAVY(6))]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     K+(XNUTP+XMTTH-XMTPH))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 = YPRED(1)+YAMPT*X1RØ
                                                                                                                                                                                                                                                                                                                                                -ATME*YABPH)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         -ATWO*YA0PH)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    CYLINDER
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                X2*XFZEL2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        SAVY (6) ))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                       YDØT ( I+6 )=YPRED ( I+7 )
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ( ( 9 ) A A P
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         "YDØT(1+6)=YPRED(1+7
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    EQUATIONS FOR
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   Ħ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 II
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   GØ TØ 9005
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            GB TB 9005
                                                                                                                                                       YDØT(1+2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             YDØT(1+5)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    YD@T(I+1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              YD@T(1+2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 YD@T(1+3)
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EPSIPH
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| 501830 | 501840 | 501860 | 501870 | 501880 | 501890 | 501910 | 501920 | Q. | 501940 | 501950 | 201260 | 501980 | 501990 | 502000 | 502010 | 502020 | 502040 | 502050 | 502060 | 502080 | 50209 | 502100 | 502110 | 502120 | 502140 | 502150 | 502160 | 502170 | 502190 | 502200 | 502210 | 502230 | 502240 | 502250 | 502270 | 502280 | 502290 | 502310 | 502320 | 502340 | 502350 | 502360 | 502380 | 502390 | 502410 | 502420 | 77 |
|--------------------------|---|--------|--------|----------------------|---|--------|--------|---------|---------------------------------|--------|--------|--------|------------------------------|----------|---|---|---------------------------------------|-------------|--------|--|--|--------|---|---|--------|----------------------------|-------------------------------|--|---|---|--------|--------|---|-------------|--------|--|-------------------------------|---|--|---|--------|----------------------------|---------------|--|--|--|--------------------------|
| Ø (4771,4772,4773),1GEØM | THE PRICEMENT OF ENGINEER ARE THE -STILOT SET | | | XK124XK214X1RB*(1.0/ | 2 (XK22+XC22**Z/XD22))}*(XN**PPRED(I+4)+YPRED(I+5)*CS-YPRED(I+ 3 6)*CN]-(XC])+YR]2*XC22*XC21/XN22*(I) 0//XR22+XC22*/21/X | | | HEXNIPH | /(XC22**2+XK22*XD22))*(YPRED(I+ | | ×٠ | ? | 5 (1+6.1)+YPRED(1+7)*CS*1R0) | × | YAMPT = (-1.0/((R8/X033)+(SNSQ*XIRB/XK33)))*(-2.0*XN* | 1 YPRED(1+7)+YPRED(1+4)+(CSIR1-CN1R0)+XN+YPRED(1+5)+ 2 (SN1D0+X101)+2 O+XN+VD0ED(1+6)+CSID0A-XD0ED(1+3+6) | XX33+SN*YAGPH*(X1*SAVY(3)+X2*SAVY(6)) | XI*SAVY(3)+ | | TANKI TAKEDILI-TAMBANIKO TAMBADBEDILT-SI-MINGA-VDREDILT-SI-MINGA-VDREDILI-SI-MINGA-VDREDILI-SI-MINGA-VDREDILI-SI-MINGA-VDREDILT-SI-MINGA-V | YAMPT#SNIR@/XK33)+RI#YA@PH#(XI#SAVY(3)+X2#SAVY(6)) | | 1 XIRBSD-YAMPT+CSIRB+(XIRI-SNIRB))-RI+K+(XFTHLD+XMPHLD+ | Z SNIKD)-(YDD (1+4)+(XI+XFVFHLI+XZ+XFFFHLZ)+XI+XBFH++ 3 (XI+XFZFII+XZ+XFZFI))-KI+XR+(YBGF(YBGH+(XI+XZ+XI))+ | ; | RI*X3*ØMEGA*(AZERØ*YPRED(I | (ABNE&YPRED(1+4)-ATHB#YABPH)) | YD8!(1+5) = KI#(YPKED(1+6)#XIK1-YPKED(1+7)#(XI#5AVY(3)+XZ*SAVY(6)) | 1 X022)*(YPRED(I+3)+K*XMTPH)-XK21*XIRB*(XN* | 2 YPRED(1+4)+YPRED(1+5)+CS-YPRED(1+6)+SN)-(XC22+XD21/XD22 | 2 | +5)*C | = XIR1*(YDØT(I+5)-YPRED(I+6))+YPRED(I+7)*(X | X2*SAVY(61) | | 2 -R1#((EPSITH+EPSIPH)*(X1*XFPHL1+X2*XFPHL2)-YPRED(1+7)* | 3 (XIOXFZELI+X20XFZEL2)) 4 | YDØT(I+2) = RL*(-YPRED(I+2)*CSIR@-YANIH#SNIR@-YPRED(I+1)*XIRI | 1 +XNSQ#YAMTH#XIROSQ=2.0#XN#YAMPT#CS#XIROSQ)+RI#K# | 2 XF2EL1*X2*XFZEL2)+YPRED(1+7)*(X1*XFPHL1+X2*XFPHL2)) | # | 5 (XI*SAVY(I)+X2*SAVY(4))) | D TIGG*YAOPH) | YD8I(I+3) = R1# (YAMIH+6CSIR8-YPRED(I+3) #CSIR8-2.0*XN*YAMPT*XIR8+ | 2 +RI*X3*(DMEGA*(ARNE*YPRED(I+5)+ATW0*YPRED(I+7))) | VDGT(1+6) = R1#(VPRED(1+7)-VPRED(1+5)*XIR1) VDGT(1+7) = R1#(-KC22/(KC22*822*K222*D22))#(VPRED(1+1)+K*XNIDH- | MINITE ALT ACES (ACES + |
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          YPRED(1+4)*SN/S+XN*YPRED(1+5)*TN/S+2.0*XN*YPRED(1+6)/S+YPRED
                           +(xK22/(XC22**2+XK22*XD22))*(YPRED(I+3)+K*XMTPH)-(XK22*
XD21/(XC22**2+XK22*XD22))*(X1RBSQ*(XN*YPRED(I+4)*SN-XNSQ
                                                                                                                                                                                           = XK12*(1.0/(XK22*XC22**2/XD22))*(YPRED(I+1)+K*XNTPH+ (XC22/XD22)*(YPRED(I+3)+K*XMTPH))-K*XNTTH+(1.0/(CS*S))
                                                                                                                                                                                                                                                                                          1.G/(XK22+XC22**2/XD22)))*(XN*YPRED(1+4)+YPRED(1+5)*CS-
YPRED(1+6)*SN)-(XC11+(XK12*XD21*XC22/XD22)*(1.o/(XK22+XC22*
                                                                                                                                                                                                                                                                                                                                                           #2/XD22)))*((1.0/(S##2#CS##2))#(XN#YPRED(1+4)#SN-XNSQ#YPRED
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XD21/(XC22**2+XK22*XD22))*((1.0/(S*CS)**2)*(XN*YPRED(I+4)*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              =-2.0#YPRED(I)/S+XN#YANTH#XICS/S-XN#YAMTH#SN#X1CS##2/S##2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          TAN/S*(YABPH*(X1*SAVY(1)+X2*SAVY(4))-YANPT*(X1*SAVY(3)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     -YPRED(I+7)*(X1*SAVY(3)+X2*SAVY(6))+(1.0/(XK22+XC22**2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     [+5]+CS-YPRED([+6)+SN)-(XC22+XD21/XD22)+((1.0/(S++2+CS++
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      -X3+BMEGA*(AZERB*YPRED(I+6)-XN/(S*CS)*(ABNE*YPRED(I+4)
                                                                                                                                                                                                                                                                                                                                                                                                                            = -xD12*(xC22/(xC22**2+XK22**XD22))*(YPRED(I+1)+K*XNTPH)
                                                                                                                                                                                                                                                                                                                                                                                                                                                          -K+XMTTH+XD12+(XK22/(XC22++2+XK22+XD22))+(YPRED(1+3)+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        YDØT(I+7) = -(XC22/(XC22**2+XK22*XD22))*(YPRED(I+1)+K*XNTPH-XK21*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        (S+CS)+XD12+XK21/(S+CS))+(XC22/(XC22++2+XK22+XD22))+(XN+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       YPRED(1+4)+YPRED(1+5)*CS-YPRED(1+6)*SN)+(XD11-XD12+XK22*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       S**2*CS**2)-K*XFPHLO-(EPSITH+EPSIR)*(X1*XFPHL1+X2*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          YDØT([+3]= YAMTH/S-YPRED([+3)/S-2.0*XN*YAMPT/(S*CS)+YAJPH+XMTHLD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  YAMPT=(-1.0/((S&CS/XD33)+(SN&TN/(XK33&S))))*(-2.0*XN&YPRED(1+7)-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  -YPRED(1+1)/S+YANTH/S-XN*YPRED(1)/(S*CS)-XN*YAMPT*SN/
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             +YAMPI#IAN/S##2-K#(XFTHLD+XMPHLD#IAN/S)-(YDØT(I+4)#
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            (X] #XFPHL] +X2#XFPHL2)+YA0PH*(X] #XFZEL]+X2#XFZEL2))-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       /XD22)) * (YPRED (I+1) + K * XNTPH + (XC22/XC22) * (YPRED (I+3)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   2))*(XN*YPRED(I+4)*SN-XNSQ*YPRED(I+6))+YPRED(I+7)/S))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            (XI * XFPHL I + X2 * XFPHL 2 ) - XICS / S * XN * (YANPT * (XI * SAVY (3) +
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                YD@T([+4)=[1.0/S)*(YPRED([+4)+XN*YPRED([+5)*X1CS+YAMPT*TN/XK33)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           -2.0+XN+YAMPT/(S++2+CS)+K+(XN+XMPHLD+X1CS/S-XFZELD)
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             -YPREU(1+2)/S-YANTH#TAN/S+XNSQ#YAMTH/(S##2#CS##2)
RØ)*(XN*YPRED([+4)+YPRED([+5)*CS-YPRED([+6)*SN))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  (1) #SN/XK33+SN*YABPH*(X1*SAVY(3)+X2*SAVY(6)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        +X3*(BMEGA*(ABNE*YPRED(1+5)+ATWØ*YPRED(1+7)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = YPRED(I+2)-YPRED(I+1)*(X1*SAVY(3)+X2*SAVY(6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  = (1.0/(S*CS))*(XN*YPRED(I+4)+CS*YPRED(I+5)-SN*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      +K*XMTPH)-(XK21/(S*CS))*(XN*YPRED(1+4)+YPRED(
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           -X3*BMEGA*(AZERB*YPRED(I+5)+ABNE*YPRED(I+7))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           -X3*BMEGA*(AZERB*YPRED(I+4)-ABNE*YABPH+TN/S*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               +YPRED(1)/XK33+YABPH*(X1#SAVY(3)+X2#SAVY(6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   = YOUT(1+5)+YPRED(1+7)*(X1*SAVY(3)+X2*SAVY(6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              X2#SAVY(6)]-YABPH#(X1#SAVY(1):X2#SAVY(4)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XFPHL2)+YPRED(1+7)+(X1+XFZEL1+X2+XFZEL2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      = XN*YPREU(1+6)*X1CS/S-YPRED(1+4)*TAN/S
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                -YPRED(1+7) # (X1 #SAVY (2) +X2 #SAVY (5))
                                                                                               *YPRED(1+6))+YPRED(1+7)*CS*X1RB))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       (ABNE + YPRED (I+4)-ATWB + YABPH))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       SN-XNSQ*YPRED(I+6))+YPRED(I+7)/S)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  = YPRED(I)+YAMPT*TAN/S
                                                                                                                                                                                                                                                               *(XK11-XK12*XK21*(
                                                                                                                                                                                                                                                                                                                                                                                             (1+6))+YPRED(1+7)/S)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         K*XMTPH)+(XC11/
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            +X2#SAVY(6)))
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    YPRED(1+6)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      YDØT (I+6)=YPRED (I+7)
                                                                                                                                                            EQUATIONS FOR CONE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   H
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                                                                                                                              9005
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              YDØT(I)
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                                                                             /(XC22**2+XK22*XD22))*(1.°0/(S#CS)**2)*(XN*YPRED(1*4)*SN
-XN**2*YPRED(1+6))+YPRED(1+7)/S)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               X2*XFZEL2))-X1R0*(YA0PH*(X1*SAVY{1)+X2*SAVY(4)}-YANPT*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               -YPRED[1+7]*[X1*SAVY[3]+X2*SAVY[6]]+[1.0/[XK22+XC22**2/XD22])*[YPRED[1+1]+K*XNTPH+[XC22/XD22]*[YPRED[1+3]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      (X1*SAVY(3)+X2*SAVY(6))-VAØPH*(X1*SAVY(1)+X2*SAVY(4)))
-X3*BMEGA*(AZERB*YPRED(1+6)-XN/RØ*(ABNE*YPRED(1+4)
                                                                                                                                                                                                             (XC22/XD22) # (YPRED(I+3) +K*XMTPH))-K*XNTTH+(XIRB*(XKII-
                                                                                                                                                                                                                                                                                                                                                                                                                                                    ||+4)-YPRED(|+6)||+(XD||-XD|2*XK22*XD2|/(XC22**2+XK22*XD22)
                                                                                                                                                                                                                                                                                                                                                                                                                         X1RB+XD12*XK21*X1RB*(XC22/(XC22**2+XK22*XD22)))*(XN*YPRED
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               YAMPT=(-1.0/({RØ/XD33)+(X1RØ/XR33)))*(-2.0*XN*YPRED(1+7)+XN*X1RØ*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               = -(XC22/(XC22**2+XK22*XD22))*(YPRED(I+1)+K*XNTPH-XK21*
                           +(XK22/(XC22*¢2+XK22¢XD22))*(YPRED(I+3)+K*XMTPH)-(XK22*
                                                                                                                                                                                                                                                                                                                  XN*YPRED(1+4)-XNSQ*YPRED(1+6))
= -XD12*(XC22/(XC22*+2+XK22*XD22))*(YPRED(1+1)+K*XNTPH)
                                                                                                                                                                                                                                                                                                                                                                      -K#XMTTH+XD12*(XK22/(XC22*#2+XK22*XD22))#(YPRED(I+3)+
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YPRED(I+3)+K*XMTPH)-(XK22*XD21/(XC22**2+XK22*XD22))*(
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  +YABPH*(X1*SAVY(3)+X2*SAVY(6))
= XN*YANTH*X1KB-XN*YAMTH*X1RBSG-K*(XFTHLD+XMPHLD*X1RB).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             EPSIPH) + (X1 + XFPHL 1 + X2 + XFPHL 2) + YPRED (I+7) + (X1 + XFZEL 1+
                                                                                                                                                                             = XK12*(1.0/(XK22+XC22**2/XD22))*(YPRED(I+1)+K*XNTPH+
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YPRED(1+4)+YPRED(1+5)*CS-YPRED(1+6)*SN)/(S*CS))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           = YPRED[1+2)-YPRED[1+1)*(X1*SAVY(3)+X2*SAVY(6))
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = YDBT(1+5)+YPRED(1+7)+(X1+SAVY(3)+X2+SAVY(6))
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    -YPRED(1+7) + (X1 +SAVY(2) +X2 +SAVY(5))
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      = XIR@#(XN*YPRED(1+6)-YPRED(1+4))
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         (X1 * SAVY(3) + X2 * SAVY(6)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             = YPRED(I)+YAMPT*X1RØ
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                                                                                                                                                                                                                                                                                                                                                                                                  K#XMTPH)+(XC11+
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                                                                                                                                                         EQUATIONS FOR CYLINDER
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#((XK33#XD33-XC16##2)#X1RB#(-2.0*XN#YPRED(1+7)+YPRED(1+4)#
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             /ANTH = {YPRED(I+1)+K*XNTPH)*(XC15*XC22+XD22*XXI2)/(XK22*XD22+
XC22**2)-K*XNTTH+(XK12*XC22-XK22*XC15)*(YPRED(I+3)+K*XMTPH)/
                                                                                                                                                              YDDT, YASAVE, YANTH, YAMTH, YAMPT, YAJPH, S, SN, CS, SNSQ,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XC15+(XK12+XD22+XK22+XD12)-XK12+XD12+XC22)/(XK22+XD22+XC22+XC22))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   = (YPRED(I+3)+K*XMTPH)*(XC15*XC22+XK22*XD12)/(XK22*XD22+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XC22*XC22)+(YPRED([+1)+K*XNTPH)*(XD22*XC15-XD12*XC22)/(XD22*XK22+
                                                                                                                                                                                                                                                                                                                                                                   COMMON TAUUS(30), UAGUS(30), SAVIIC(902)

COMMON NA, TEFREE, TIC, PHI, STOP, RESTOP, RTICK, GI, XNL(3), NH

COMMON NST(30), NRL(30), NXMAT(20), SAVIIC(30), SAVITP(30), JRTIC(30)

COMMON NST(30), NREG, NPPT, NRC, NSC, NIX, IERROR, KGEOM, IGEOM, ISTTAB

COMMON KELVIN, IOEGIN, NPROB, NSEG, NERROR, GTHICK, NDJS, NLINKS, NLCASE

COMMON NISKL, NZ, NBCT, LINPUT, NTRKL, NPASS, XNI, KBC, NRINGS

COMMON / GUOAZN/ YPRED(80), YOET(80), YASAVE(80),
                                                                                                                                                                                        CSSQ, TAN, SEC, CN, X1CS, X1SN, TN, X1RØ, X1RØSQ, X1SNRØ,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         RØSQ,XNSQ,BETA,R1,R2,S1,R1DØT,
XNTTH,XNTPH,XMTTH,XMTPH,XFTHLD,XFPHLD,XFZELD,
XMTHLD,XMPHLD,ETHET(2),FPHI(2),XGPT(2),ALPHTH(2),ALPHPH(2),DUM,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XD22))/(XC22*XC22+XK22*XD22))+X1RØ*(XN*YPRED(1+4)+YPRED(1+5)*CS-
YPRED(1+6)*SN)*(XC11+(XD12*XC22*XK12-XC15*(XC15*XC22+XD12*XK22+
XD22*XK12))/(XC22*XC22+XK22*XD2))
                                                                                                                                                                                                                 XICSRØ, CNIRØ, SNIRØ, CSIRØ, XIRI, XIRZ, CSIRI, CSIR2,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          YPRED(1+6)*SN)*(XK11+(XC15*(XC15*XK22-2.0*XK12*XC22)-XK12*XK12*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  KIRI, XIRZ, CSIRI, CSIR2, SNIRI, XIRISQ, R2SQ, R0, BESQ,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           IF (KGEDM.EQ.1.0R.KGEBM.EQ.2.0R.KGEBM.EQ.5.0R.KGEBM.EQ.6) IGEBM
If (KGEDM.EQ.3) IGEBM=2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XNUIP, XNUPT, XC11, XC22, XC15, XD33, XD22, XD21, XD12,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  X1R0+YPRED(1+7)+CS)+(XD11-(XD12+XD12+XK22+XC15+(2.0+XC22+XD12-
                                                                                                                                                                                                                                           SNIR), XIRISG, RZSG, RØ, BESQ, RØSQ, XNSQ, RI, RZ, SI, RIDDI, XNITH, XNIPH, XMTPH, XMTPH, XCII, XC22, XC15,
                                                                                                                                                                                                                                                                                              XD33,XD22,XC21,XD12,XK11,XK12,XK21,XK22,XK33,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XC22**2)-K*XMTTH+{X1RØSG*{XN*YPRED{I+4}*SN-XNSG*YPRED{I+6}}+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               S, SN, CS, SNSQ, CSSQ, TAN, SEC, CN, XICS, XISN, TN, XIRB, XIRBSQ, XISNRB, XICSRB, CNIRB, SNIRB, CSIRB,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XD22)/(XK22+XD22+XC22+XC22))+(X1RØSQ*(XN*YPRED(I+4)*SN-XNSQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XNPHI,M.I,BETTA,ZETTA,SAVY(8),XC16
CEMMON /PLS/ BMEGA,IWORD,XMERD,XPRES,XMENI,AZERO,AGNE,ATWO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                (XC22*XC22+XK22*XD22)+X1R8*(XN*YPRED(1+4)+YPRED(1+5)*CS-
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                                                                                                                                                                                                                                                                                                                                                    STØRY(16), XMAT(110,10), STD(10), SADUS(30), RADUS(30)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          THE FOLLOWING EQUATIONS ARE THE -RWAF- SET EQUATIONS FOR SHELLS OF REVOLUTION ( PHI COORDINATE )
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              = (1.0/(XC16*SN*X1RØ-XK33-SN*X1RØ*(XD33*SN/(
                                                                                                        SAVIIC, TIC, PHI, STØP, RESTØP, RTICK
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  = XN*YPRED(I+6)*XIRB-YPRED(I+4)*SNIRB
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XK11, XK12, XK21, XK22, XK33, XD11,
                         SUBRBUTINE DIFF2 (XFPHLI,XFZELI,XFPHL2,XFZEL2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   YAN TH, YAMTH, YAMPT, YAJPH,
                                                                                                                                                                                                                                                                                                                          XD11,XNPHI,BETA,XC16
                                                INTEGER SAVJIC, SAVSIP, Q, THICK
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    IF (NH.EQ.0) K = 1
GØ TØ (7341,7342,7343),IGEØM
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IF ( KGEBM.EQ.7 ) IGEBM = 1
                                                                                                                                    YPREU
                                                                          INTEGER XN1, XN
UDUBLE PRECISION S
DEUBLE PRECISION Y
DOUBLE PRECISION Y
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    PRED(1+6))+X1R8*YPRED(1+7)*CS)*(XC22*XD12-XC15*XD22))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   -R1*((EPSITH+EPSIPH)*(X1*XFPHL1+X2*XFPHL2)-YPRED(I+7)*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              -R1*X3*BMEGA*(AZERB*YPRED(I+6)-XN/RB*(ABNE*YPRED(I+4)-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      = (YPRED(1+1)+K*XNTPH)*(XC15*XC22+XD22*XK12)/(XK22*XD22+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XC22**2)-K*XMTTH+(1.0/(S*S*CSSQ)*(-XNSQ*YPRED(1+6)+XN*YPRED(1+4)*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      SN)+YPRED(I+7)/S)*(XD11-(XD12*XD12*XK22+XC15*(2.0*XC22*XD12-XC15*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       *(XN*YPRED(I+4)+YPRED(I+5)*CS-YPRED(I+6)*SN)*(XK12*XC22-XK22*XC15)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   6 XC15*(XK12*XD22+XK22*XD12)-XK12*XD12*XC22)/(XK22*XD22+XC22))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  (YPRED(1+3)+K*XMTPH)*(XC15*XC22+XK22*XD12)/(XK22*XD22+
                               I+6)*CS*X1RB)+YABPH*SN*(XI*SAVY(3)+X2*SAVY(6))+YPRED(I)*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |XD22*(YPRED(1+1)+K*XNTPH)+XC22*(YPRED(1+3)+K*XMTPH)-
                                                                                                                                                                                                                                                                                                                          XIRBSQ-YAMPT*CSIRB*(XIRI-SNIRB))-RI*K*(XFTHLD+XMPHLD*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       YPRED(1+6)-R1*YPRED(1+7)*(X1*SAVY(3)+X2*SAVY(6))+R1*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XC22**2)+(YPRED(I+1)+K*XNTPH)*(XD22*XC15-XD12*XC22)/(XD22*XK22+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         -(X1R0SG*(XN*YPRED(I+4)*SN-XNSQ*YPRED(I+6))+X1R@*YPRED(I+7)*CS)*
                                                                                                                                                                                          = RI*(YPRED(I+4)*CS*XIRB+YABPH*(X1*SAVY(3)+X2*SAVY(6))
CS*XIR1-CNIR0)+XN*YPRED(I+5)*(XIR1+SNIR0)+2.0*XN*YPRED
                                                                                                                                                                                                                                                                                                                                                                                           XI*XFZELI+X2*XFZELZ))-RI*SNIRØ*(YAØPH*(XI*SAVY(1)+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XIR8*(XN*YPRED(1+4)+YPRED(1+5)*CS-YPRED(1+6)*SN)
XIR1*(YDB1(1+5)-YPRED(1+6))+YPRED(1+7)*(X1*SAVY(3)+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XF2EL1+X2*XFZEL2)+YPRED(1+7)*(X1*XFPHL1+X2*XFPHL2))
                                                                                                                                                                                                                                                           XC16**2/XD33})*(YPRED(I)+YAMPT*(SN*XIRB-XC16/XD33)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             RI*(YAMIH#CSIRØ-YPRED(I+3)*CSIRØ-2.0*XN*YAMPT*XIRØ+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XK12*XD22+XC15*XC22)-(X1RBSQ*(XN*YPRED(I+4)-XNSQ*
                                                                                                                                                                                                                                                                                          = RI*(-2.0*YPRED(I)*CSIRØ+XN*YANTH*XIRØ-XN*YAMTH*SN*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    YAMPT*(SN*X1R0+X1R1))+YPRED(I+2)*X1R1)-R1*K*XFPHLD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    (XC22*XC22+XK22*XD22)+(XN*YPRED(I+4)+YPRED(I+5)*CS-YPRED(I+6)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     KIRØ*(XN*YPRED(I+4)+YPRED(I+5)*CS-YPRED(I+6)*SN)*
                                                                                                                                                                                                                                                                                                                                                            SN1R01-(YD01([+41*(X1*XFPHL]+X2*XFPHL21+R1*YABPH*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                -R1+X1RB+XN+(YANPT+(X1+SAVY(3)+X2+SAVY(6))-YABPH+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XC22**2)-K*XNTTH+(XK12*XC22-XK22*XC15)*(YPRED(1+3)+K*XMTPH)/
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 RI*(-YPRED(I+2)*CS1RB-YANTH*SN1RB-YPRED(I+1)*X1R1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         RI*(XK22*(YPRED(I+3)+K*XMIPH)-XC22*(YPRED(I+1)+K*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   *SN)/(S*CS)*{XX11+(XC15*{XC15*XK22-2*0*XK12*XC22)-XK12*XK12*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    YPRED(1+6))/(S*S*CSSQ)+YPRED(1+7)/S)*(-XC11+(XC15*XC15*XC22+
                                                                                                                                                                                                                                                                                                                                                                                                                                                         -RI *X3 * BMEGA * (A ZERB * YPRED (I + 4) - ABNE * YABP H+SN/RB *
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   +XNSQ+YAMTH+X1R8SQ-2.0+XN+YAMPT+CS+X1R8SQ)+R1+K+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  (XN*XMPHLO*X1RB-XFZELO)-R1*((EPSITH+EPSIPH)*(X1*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           +RI *x3 * (BMEGA * (AGNE *YPRED(I+5)+ATWB *YPRED(I+7)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     RI*(CSIRØ*(YANTH-YPRED(I+1))-XN*XIRØ*(YPRED(I)+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     -Rl#x3#BMEGA#(AZERB#YPREO(I+5)+ABNE#YPREO(I+7))
                                                                                             = YPRED(1+2)-YPRED(1+1)*(X1*SAVY(3)+X2*SAVY(6))
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                                                                                                                                                                                                                                                                                                                                                                                                                          K2*SAVY(4))-YANPT*(X1*SAVY(3)+X2*SAVY(6)))
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                                                                                                                            -YPRED(I+7)*(X1*SAVY(2)+X2*SAVY(5))
                                                                                                                                                                                                                         +XN*YPRED(1+5)*X1R8+(1.0/1XK33-
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        (ABNE *YPRED(1+4)-ATHØ*YABPH))
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      (X1 * XF ZEL 1 + X 2 * XF ZEL 2 ))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      /(XK22*XD22+XC22**2)
                                                                                                                                                           = YPRED(I)+YAMPT * SNIRØ
                                                              (XD33*SN*X1RØ-XC16))
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                                                                                                                   /AMPT =({XC16+TAN/S-XK33-(TAN/S)+(XD33+TAN/S-XC16)}++(-1)}+({XK33+
                                                                                                                                                                                                                                                                                                                                                                                                                           =-2.0*YPRED(1)/S+XN*YANTH*X1CS/S-XN*YAMTH*SN*X1CS**2/S**2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                = (YPRED(I+1)+K*XNTPH)*(XC15*XC22+XD22*XK12)/(XK22*XD22+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    TAN/S+(YABPH+(X1+SAVY(1)+X2+SAVY(4))-YANPT+(X1+SAVY(3)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XC15+(XK12+XD22+XK22+XD12)-XK12+XD12+XC22)/(XK22+XD22+XC22))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            (YPRED(I+3)+K*XMTPH)*(XC15*XC22+XK22*XD12)/(XK22*XD22+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       -X3+ØMEGA+(A2ERØ+YPRED(I+6)-XN/(S*CS)+(AØNE+YPRED(I+4)
                                                                                                                                          XD33-XC16**2)*(1.0/(S*CS))*(-2.0*XN*YPREG(147)-YPRED(144)*
SN/S+XN*YPRED(11+5)*TAN/S+2.0*XN*YPRED(1+6)/S)+YABPH*SN*
(X1*SAVY(3)+X2*SAVY(6))*YPRED(1)*(XD33*TAN/S-XC16))
= YPRED(1+2)-YPRED(1+1)*(X1*SAVY(3)+X2*SAVY(6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        -YPRED(I+7)*(X1*SAVY(3)+X2*SAVY(6))+(XD22*(YPRED(I+1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      7DØT(1+7) = (XK22*(YPRED(1+3)+K*XMTPH)-XC22*(YPRED(1+1)+K*XNTPH)+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1001(1+3)= YAMTH/S-YPRED(1+3)/S-2.0*XN*YAMPT/(S*CS)+YAJPH+XMTHLD
                            YPRED(I+6)*SN)*(XC11+(XD12*XC22*XK12-XC15*(XC15*XC22+XD12*XK22+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XD22+XC15*XC22)*(1.0/(S*CS)*(XN*YPRED(1+4)+YPRED(1+5)*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              YPRED(I+6)+XN*YPRED(I+4)*SN)/(S*S*CSSQ)+YPRED(I+7)/S))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         I XC22**2)+(YPRED(I+1)+K*XNTPH)*(XD22*XC15-XD12*XC22)/(XD22*XK22+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        (S**2*CS**2)-K*XFPHLO-(EPSITH+EPSIPH)*(X1*XFPHL1+X2*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 -YPRED(I+1)/S+YANTH/S-XN*YPRED(I)/(S*CS)-XN*YAMPI*SN/
                                                                                                                                                                                                                                                                                                                                                                                                                                                        +YAMPI*IAN/S**2-K*(XFTHLD+XMPHLO*TAN/S)-(YDBT(I+4)*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        (X1*XFPHL1+X2*XFPHL2)+YA0PH*(X1*XFZEL1+X2*XFZEL2))-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              -2.0*XN*YAMPT/(S**2*CS)+K*(XN*XMPHLD*X1CS/S-XFZELD)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             (X1*XFPHL1+X2*XFPHL2)-X1CS/S*XN*(YANPT*(X1*SAVY(3)+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                (XK12*XC22-XK22*XC15)*(1.0/(S*CS)*(XN*YPRED(1+4)+
YPRED(1+5)*CS-YPRED(1+6)*SN))-(XC15*XC22+XK22*XD12)*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                -(EPSITH+EPSIPH)*(XI*XFZEL]+X2*XFZEL2)-YPRED(I+7)*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    -YPRED(1+2)/S-YANTH*TAN/S+XNSQ*YAMTH/(S*#2+CS*#2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XC22**2)-K*XNTTH+(XK12*XC22-XK22*XC15)*(YPRED(I+3)+K*XMTPH)/
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         YPRED(]+6))#(XK]]+(XG]5#(XC]5#XK22-2.0#XK]2#XC22)-XK]2#XK]2#
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 CS-YPRED(I+6)*SN))-(XC22*XD12-XC15*XD22)*((-XNSQ*
                                                                                                                                                                                                                                                                                                                                  YPRED(I+4)/S+YABPH#(X1*SAVY(3)+X2*SAVY(6))+XN#
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ((-XNSQ*YPRED(1+6)+XN*YPRED(1+4)*SN)/(S*S*CSSQ)+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             +X3 + ( DMEGA + ( ADNE + YPRED ( I + 5 ) +ATWB + YPRED ( I + 7 ) ) )
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XD22)/(XK22*XD22+XC22*XC22))+(XIRBSQ*(XN*YPRED(I+4)-XNSQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = (1.0/(S*CS))*(XN*YPRED(I+4)+CS*YPRED(I+5)-SN*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              -X3*BMEGA*(AZERB*YPRED(I+4)-ABNE*YABPH+TN/S*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 YDØT(I+5)+YPRED(I+7)*(X1*SAVY(3)+X2*SAVY(6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       -X3*BMEGA*(AZER8*YPRED(I+5)+ABNE*YPRED(I+7))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    +K*XNTPH)+XC22*(YPRED(I+3)+K*XMTPH)-(XK12*
                                                                                                                                                                                                                                                                                                                                                                                              XD33))*(YPRED(1)+YAMPT*(TAN/S-XC16/XD33))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       X2*SAVY(6))-YABPH*(X1*SAVY(1)+X2*SAVY(4)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XFPHL2)+YPRED(I+7)*(XI*XFZEL1+X2*XFZEL2)
                                                                                      = XN*YPRED(I+6)*XICS/S-YPRED(I+4)*TAN/S
                                                                                                                                                                                                                                                                                                                                                                  YPRED[1+5]/[S*CS]+[1.0/[XK33-XC16**2/
                                                                                                                                                                                                                                                                        -YPRED(1+7) + (X1 + SAVY(2) + X2 + SAVY(5))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       YPRED (1+7)/S))/(XK22*XD22+XC22*XC22
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         (xC22*XC22+XK22*XD22)+X1RB*(XN*YPRED(I+4)-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              (ABNE*YPRED(I+4)-ATWB*YABPH)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   #YPRED(1+6)))#(-XC11+(XC15#XC15#XC22+
                                                         XD22*XK12))/(XC22*XC22+XK22*XD22))
                                                                                                                                                                                                                                                                                               YPRED(I)+YAMPT*TAN/S
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             /(XK22*XD22+XC22*XC22)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    +X2*SAVY(6)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                -ATME *YABPH))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       YPRED(I+6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      EQUATIONS FOR CYLINDER
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         TDØT ( 1+6 )=YPRED ( 1+7
YPRED(I+5)*CS-
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                      K2*XFZEL2))-XIRO*(YABPH*(XI*SAVY(I)+X2*SAVY(4))-YANPT*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          (X1 & SAVY(3) + X2 & SAVY(6)) - YABPH * (X1 * SAVY(1) + X2 & SAVY(4)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            YOUT(1+5) = -YPRED(1+7)*(X1*SAVY(3)+X2*SAVY(6))+(XD22*(YPRED(1+1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1(XN*YPRED(1+4)-YPRED(1+6))*(XK12*XC22-XK22*XC15)-X1R0SQ*(XN*YPRED
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   2(1+4)-XNSQ*YPRED(1+6))*(XC15*XC22+XK22*XD12))/(XC22**2+XK22*XD22)
C0NTINUE
                                                                                                                                                                    YAMPT=(1/(XC16+X1RB-XK33-X1R8+(XD33+X1RB-XC16)))+((XK33+XD33-XC16
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   (XN*YPRED(1+4)-YPRED(1+6))*(XK12*XD22+XC15*XC22)-X1R0SQ*(XN*YPRED
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             2(I+4)-XNSQ*YPKED(I+6))*(XC22*XDI2-XCI5*XD22))/(XK22*XD22+XC22**2)
                                                                                                                                                                                            **2)*X1RB*(-2.0*XN*YPRED(I+7)+XN*X1RB*YPRED(I+5))+YABPH*
                                                                                                                                                                                                                                                                                                                                                                                                               = XN*YANTH*XIRB-XN*YAMTH*XIRBSQ-K*(XFIHLD+XMPHLD*XIRB)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         -XN*XIR@*YPRED(I]-XN*YAMPT*XIR@SQ-K*XFPHLD-(EPSITH+
EPSIPH)*(X1*XFPHL1+X2*XFPHL2)+YPRED(I+7)*(X1*XFZEL1+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       YD3T(1+7) = (XK22*(YPRED(1+3)+K*XMTPH)-XC22*(YPRED(1+1)+K*XNTPH)
                                                                                                                                                                                                                                                                                                                                                                                                                                               -{\DBT(I+4)*(X1*XFPHLI+X2*XFPHL2)+YABPH*(X1*XFZELI+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    -X3*BMEGA*(AZERB*YPRED(I+6)-XN/RB*(ABNE*YPRED(I+4)
                                                                                                                                                                                                                                                                                                                              = (YAUPH*(X1*SAVY(3)+X2*SAVY(6))+XN*YPRED(1+5)/R0)+
                                                                                   YPRED(1+6))*(XC11+(XD12*XC22*XK12-XC15*(XC15*KC22+XD12*XK22+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             PPRED(I+7)*(X1*XFPHL1+X2*XFPHL2)-X1RB*XN*(YANPT*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       -YANTH#X1RB+XNSQ#YAMTH#X1RBSQ+K#(XN#XMPHLD#X1RB-
                                                                                                                                                                                                                      (X1*SAVY(3)+X2*SAVY(6))+YPRED(1)*(XD33*X1RB-XC16))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XFZELD)-(EPSITH+EPSIPH)*(X1*XFZEL1+X2*XFZEL2)-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             -X3*BMEGA*(AZER8*YPRED(I+4)-ABNE*YABPH+1.0/RB*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   +X3*(BMEGA*(ABNE*YPRED(I+5)+ATWB*YPRED(I+7)))
                                                                                                                                                                                                                                                   = YPRED(1+2)-YPRED(1+1)*(X1*SAVY(3)+X2*SAVY(6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    YDØT(I+5)+YPRED(I+7)#(X1#SAVY(3)+X2#SAVY(6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               -X3+BMEGA+(AZERB+YPRED(I+5)+ABNE+YPRED(I+7))
XC22**2)-K*XMTTH+X1RBSQ*(XN*YPRED(1+4)-XNSQ*YPRED(1+6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         +K*XNTPH)+XC22*(YPRED(I+3)+K*XMTPH)-X1RB*
                                                            XD22))/(XC22#XC22+XK22#XD22))+X1RB#(XN#YPRED(I+4)-
                            {XD11-(XD12*XD12*XK22+XC15*(2.0*XC22*XD12-XC15*
                                                                                                                                                                                                                                                                                                                                                           (1.0/(XK33-XC16**2/XD33))*(YPRED(I)+
                                                                                                                                                                                                                                                                             -YPRED([+7)*(X]*SAVY(2)+X2*SAVY(5))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         rdøt(1+3) = -2.0*xn*YAMPT*XIRB+YAJPH+K*XMTHLD
                                                                                                                                          = XIR@*(XN*YPRED(I+6)-YPRED(I+4))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          = XIRØ*(XN*YPRED(I+4)-YPRED(I+6)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ABNE #YPRED (I+4)-ATW@#YA@PH))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   (XI*SAVY(3)+X2*SAVY(6)))
                                                                                                             6 XD22*XK12))/(XC22*XC22+XK22*XD22))
                                                                                                                                                                                                                                                                                                                                                                                        YAMPT*(X1RB-XC16/XD33))
                                                                                                                                                                                                                                                                                                       = YPRED(1)+YAMPT#XIRØ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              -ATW@*YABPH))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        X2*XFZEL2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             YDØT (1+6)=YPRED (1+7
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      +X1K0*
                                                                                                                                                                                                                                                                                                                                    YD&T(1+4)
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       YDØT(I+2)
                                                                                                                                                                                                                                                                                                                                                                                                               YDØT(I)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          EPSITH
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                                                                                                                                                                                                                                                   YAJPH
                                                                                                                                                                                                                                                                                                       YANPT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  9008
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SUBROUTINE SEGMAT

The results of the subroutine link, RIEMAN, are passed through the label common area, IYCORR, to this subroutine. SEGMAT places the elements of the YCORR array into several double-subscripted arrays, forms some coordinate transformation arrays, and calls subroutine SREVN2 for double precision matrix inversion.

As a result of appropriate matrix operations this subroutine produces a segment stiffness matrix, the XKS array, and a segment load matrix, the XIS array, for each segment. In passes other than the first pass, first cycle, the XIS array is not calculated. SEGMAT also orients each segment into the global coordinate system of the structure as a result of the matrix operations.

Subroutine SREVN2

SREVN2 is a subroutine called by SEGMAT to invert a real, double-precision, in-core matrix utilizing Gauss-Jordan elimination with partial pivoting.

| | CODD |
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| | |

ENGINEERING SYMBOLS (REF. 1)

SNI

SNJ

CST

CSJ

A MATRIX

B. MATRIX

C MATRIX

D MATRIX

E MATRIX

XKT MATRIX

XMAX MATRIX

XKS MATRIX

XLS MATRIX

si

sj

cí

сj

$$\begin{bmatrix} IFT & | & O \\ \hline O & | & JFT \end{bmatrix}$$

$$\begin{bmatrix} 0 & | & I_{1_1} & | & 0 \\ \hline X_1 & | & X_2 & | & X_3 \end{bmatrix}$$

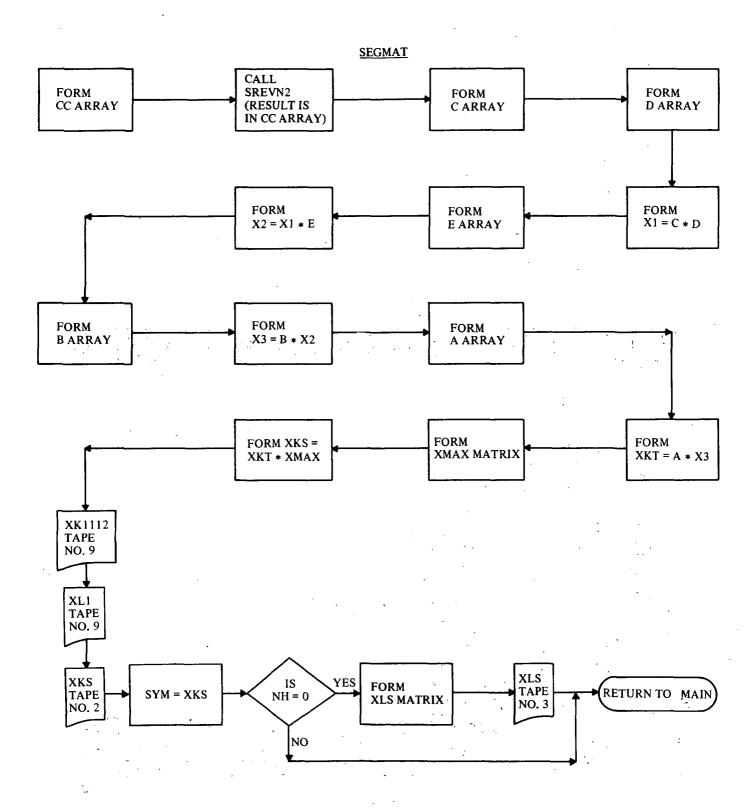
$$\begin{bmatrix} I_{1_{1}} & 0 & 0 & 0 \\ \hline 0 & Y_{2} & 0 & 0 \\ \hline 0 & 0 & I_{p} \end{bmatrix}$$

$$\begin{bmatrix} I_{14} & | & 0 & | & 0 \\ -Y_{1} & | & JDT^{T} & | & -Y_{3} \\ \hline 0 & | & 0 & | & I_{p} \end{bmatrix}$$

$$\begin{bmatrix} IDT^{T} & 0 & 0 & 0 \\ \hline 0 & 1 & 1_{1} & 0 & 0 \\ \hline 0 & 0 & 0 & 1_{1} \end{bmatrix}$$

$$\begin{bmatrix} 2\pi r_0(i) & | & \\ & & 2\pi r_0(j) \end{bmatrix}$$

$$\begin{array}{c}
\begin{pmatrix} \lambda \\ k \end{pmatrix} & (n) \\
\begin{pmatrix} \lambda \\ \ell \end{pmatrix} & (n)
\end{array}$$



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                                                                                                                                                                                                           COMMON NST(30), NKL(30, NXMAT(20), SAVJTC(30), SAVSTP(30), JRTIC(30)
COMMON JRSTOP(30), NREG, NMPT, NRC, NSC, NIX, IERROR, KGEOM, IGEOM, ISTTAB
                                                                                                                                                                                                                                                       KELVIN, I BEGIN, NPRBB, NSEG, NERRBR, Q, THICK, NBJS, NLINKS, NLCASE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         E (X2(1), C(1), A(1), XKS(1)), (X1(1), B(1), XKT(1), SYM(1))
                                                                                                                                                                                                                                                                                                               DIMENSION C(18,18), CC(4,4), D(18,18), E(18,18), B(8,18), A(8,8)

DIMENSION XI(18,18), X2(18,18), X3(8,18), XKT(8,18), XMAX(8,18)

DIMENSION XESCE, 18), XLS(8,2), SYM(8,18)

DIMENSION DEAD(4)

DIMENSION LABEL(16)

DIMENSION NI(2)

DIMENSION NI(2)

DIMENSION NI(2)
                                                                                                                                              COMMON STORY(16), XMAT(11C, 10), STD(10), SADUS(30), RADUS(30)
                                                                                                                                                                                       COMMON XN, TEFREE, TIC, PHI, STOP, RESTOP, RTICK, G1, XNL(3), NH
                                                                                                                                                                                                                                                   COMMON KELVIN, 18EGIN, NPROB, NSEG, NERROR, G, THICK, NBJS, NL
COMMON NTSKL, NZ, NBCT, LINPUT, NTRKL, NPASS, XNI, KBC, NRINGS
                                                                                  DØUBLE PRECISIØN SAVTIC,TIC,PHI,STØP,RESTØP,RTICK,YCØ
DØUBLE PRECISIØN C,CC,D,E,B,A,XI,X2,X3,XKT,XMAX,XKS
OØUBLE PRECISIØN RI,R1,CSI,CSJ,SNI,SNJ,X2PIRI,X2PIRJ
                                                                                                                                                                     COMMON TADUS (30), UADUS (30), SAVTIC (900)
                    SUBRBUTINE SEGMAT INTEGER SAVJTC, SAVSIP, Q, THICK
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      IF (NH.EQ.0) WRITE(6,1726)
                                                                                                                                                                                                                                                                                               COMMON /LYCORR/ YCORR (80)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1601,602,603), IGEOM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             CØS(1.570796-A1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          SIN(1.570796-A1)
                                                              XN1,XN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         CBS(STBP
                                                                                                                                                                                                                                                                                                                                                                                                                                                                    EQUIVALENCE
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     C(1,J)=0.0
K=28
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             (X)NIS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 CBS(X)
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FOR, IS
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9 D(I,1)=-YC@RR(L)

DØ 120 J=1,JJ

DØ 120 I=1,JJ

XI(I,J)=C.0

UØ 120 M=1,JJ

O XI(I,J)=XI(I,J)+C(I,M)*D(M,J)

DØ 121 J=1,18

DØ 121 I=1,18
                                                               CALL SREVNZ (CC.4.DEAD.4.NIX)
                                                                           IF (NIX.NE.0) GØTØ 8120
                                                                                                                                                                                                                                                                                                                                                                                                         DØ 118 1=5,8
L=L+1
: D(I,J)= -YCØRR(L)
K=60
DØ 119 J=9,JJ
K=K+8
L=K
                                                                                                                                                      C(1,1)=CC(11,11)
DØ 114 [J=1,4
                                                                                                                                                                                                                                                                         0 (f,1)=1.0
0 (1+1,1+1)=-SNJ
0 (1+2,1+2)=-SNJ
0 (1+3,1+3)=1.0
0 (1+3,1+2)= CSJ
0 (1+1,1+2)= CSJ
0 (1+2,1+1)=-CSJ
                                                     CC(I,J)=YCBRR(L)
                                                                                                                                                                                      00 115 1J=9, JJ
C(1J+1J)=1.0
D0 116 J=1, 18
D0 116 I=1, 18
O(1, J)=0.0
U0 117 IJ=1, 4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         E(1+2,1+2)=-SNI
E(1+3,1+3)=1.0
E(1+1,1+2)=CSI
                                                                                    J1=0
DØ 113 J=5,8
J1=J1+1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                E(I+1,I+1)=-SN
                                                                                                                                                                                                                                                                                                                                           DØ 218 IJ=9,JJ
00 112 J=1,4
K=K+8
L=K
                                                                                                                                00 113 I=5,8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   00 119 I=5,8
L=L+1
                                DØ 112 I=1,4
L=L+1
                                                                                                                                                                             C(13,13)=1.0
                                                                                                                                                                                                                                                                                                                                                                           DØ 118 J=1,4
K=K+8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               E(I,J)=0.0
                                                                                                                                             11=11+1
                                                                                                                        0=II
                                                                                                                                                                                                                                  116
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                                                                                                                                                                            114
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X3(I,J)=X3(I,J)+B(I,M)+X2(M,J)
                                                                                                                                                                                                                                                                                                                                                                                                                             A(I,1)=-1.0
A(I+1,1+1)=SNI
A(I+2,1+2)=SNI
A(I+1,1+2)=CSI
A(I+2,1+1)=-CSI
A(I+3,1+3)=1.0
I=5
                                                                                                                                                                                                                                                       B(1,1)=YC@RR(L)
K=56
                                                                                                                                                                                    B(I,J)=YCORR(L)
                                                                                                                                                                                                                                                                           DØ 128 J=9,JJ
K=K+8
L=K
DØ 128 I=5,8
L=L+1
                                                                                                                                                                                                                                                                                                                               B(I, J) = YCBRR (L
                                                                                                                                                                   00 126 I=5,8
L=L+1
                                                                                               00 125 1=1,4
                                                                                                                                                                                                                                    00 127 1=5,8
                                                                                                                                      DØ 126 J=1,4
K=K+8
                                               X2(I,J)=X2()
                                                                                                                   B([,J)=1.0
                                                                                                                                                                                                                                                                                                                                                                                                           A(1,1)=0.0
                                                                                                                             K = - 8
                                                                            124
                                                                                                                   125
                                                                                                                                                                                                                                                         127
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122
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                                                                                                                                                                                                                                                                                                                                     I BHDELTA 21,7X,8HDELTA R1,7X,7HTHETA 1,8X,8HDELTA T2,7X,8HDELTA 22
                                                                                                                                                                                                                                                                                                                                                                                                                IF (NH.EQ.O.BR.IBEGIN.EQ.1) WRITE(6,23) (LABEL(I),1=II,III),
                                                                                                                                                                                                                                                                                                                                                                                                                             (XKS(M, J), J=1,8)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          9968 FBRMAT(1H ,8(E14.7,2X)/(5X,8(E14.7,2X)))
                                                                                                                                                                                                                       (I+J)=XKS(I+J)+XMAX(I+M)*XKT(M+J)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             WRITE(2) ((SYM(I,J),J=1,8),I=1,8)
DØ 131 M=1,8
XKT(I,J)=XKT(I,J)+A(I,M)*X3(M,J)
                                                                                                                                                                                                                                                                                                                                                                                                                                         23 FORMAT(/1X,2A4,1X,8(E14.7,1X))
                                                                                                                                                                                                                                                                                                                                                   ,7x,8HDELTA R2,7x,7HTHETA 2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  IF(J.NE.I)GB TB 138
IF(XKS(I,J).GE.O.O)GB TB 138
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     [F.(INDEC.EQ.0)GB TB 15]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             IF (NRC1.EQ.0)GBTB 143
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  SYM(M,J) = XKS(M,J)
20 CØNTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         SYM(I,J)=XKS(I,J)
                                                                                                                                                                                                                                                                                                                           FORMAT(/////55)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ISEG=TSEG+NST(I)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               SAVTIC(1SEG)=TIC
                                                   X2PIRI=2.0*PI*RI
                                                                          X2PIRJ=2.0*PI*RJ
                                                                                                                                                                    XMAX(J,J)=X2PIRJ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          DØ 244 I=1,NRC1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ISEG=ISEG+NSC
                        PI=3.1415927
                                                                                                                                                                                                        XKS(1,J)=0.0
DØ 135 M=1,8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 SYM(.I, J.)=0.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          00 138 I=1,8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         00 137' J=1,8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       00 138 J=1,8
                                                                                                                                                                                                                                                                                                                                                                            DB 20 M=1,8
                                                                                                                                                                                                                                                                                                                                                                                                                                                       DØ 20 J=1,8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             WRITE(6,152)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               NRC1=NRC-1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            INDEC=0
                                                              RJ=RESTOP
                                                                                                                                                                                                                                                                                                                                                                                        [] = [] [+]
                                    RI=RTICK
                                                                                                                                                                                                                                                                                     WR ITE (9)
                                                                                                                                                                                                                                                                                                                                                                                                     [ [ ] = [ [ + ]
                                                                                                                                                                                                                                                                      SYM(I,J)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            INDEC=1
                                                                                                                              00 133
                                                                                                                                                        DØ 134
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     I SEG=0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        11=8
                                                                                                                                                                                                                                 XKS(1
                                                                                                                                                                               00
                                                                                                                  132
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| 152 | 152 FORMAT(7///- seresessessessessessessessessessesses | 702450 |
|-----|---|--------|
| | TURY ADDRAG ON MAIN DIACONAL DEVICE CTATES ATTACHMENT OF CONTRACT | |
| | THE BUILD DIAGONAL. REVISE SILING | 707400 |
| 151 | 151 13=2 | 702470 |
| | 8 H Z | 702480 |
| | 1.#1 | 702490 |
| | 08 42 11=11,7 | 702500 |
| | | 702510 |
| | 0.6 43 I=M.N | 702520 |
| | ALPH = ABS(SYM(I,J)) - ABS(SYM(J,I)) | 702530 |
| | JF(ALPH) 47,71,48 | 702540 |
| 47 | 47 IF(SYM(1,J).EQ.0.0) GBTB 71 | 702550 |
| | SYM(1, 1, 1). = SYM(1, 1, 1) SYM(1, 1) | 702560 |
| | GØTØ 43 | 702570 |
| 48 | 48 IF(SYM(J,I).EQ.0.0) G0TØ 71 | 702580 |
| | SAM(1) = SAM(1) / SAM(1) | 702590 |
| | GBTB 43 · · | 702600 |
| 71 | 71 SYM(1+1) = 1.0 | 702610 |
| 43 | SYM(3.1) = 0.0 | 702620 |
| | | |

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702710
702720
702720
702730
702750
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702780
702800
702810
                                                                                                                                                                                                                                                                                               702870
702880
702910
702920
                                                                                                                                                                                                                                                                    702840
                                                                                                                                                                                                                                                                                                 IF (NH.EQ.O.0R.IBEGIN.EQ.1) WRITE(6,795) RTICK, RESTOP
795 FORMAT(/- RZERØ(!) =-, IPE15.6,10x,-RZERØ(J) =-, IPE15.6)
                                    FORMAT(//55x, 22HSEGMENT SYMMETRY CHECK,)
                                                                                                                                                                                   FORMAT(//55X, 22H SEGMENT LOAD MATRICES ,)
            NH.NE.O.AND.IBEGIN.NE.1) GØ TØ 145
                                                                                                                                          XLS(I,J)=XKS( I,J)
WRITE(3)((XLS(I,J),J=I,NPRØB),I=1,8)
                                                                                                                                                                                                              840 WRITE(6,9968)(XLS(I,J), J=1,NPRØB)
                                                                                                                                                                     WRITE (6,782)
                                                                                                                                                                                                   DØ 840 I=1,8
                                                                                                                                                                                                                                            IERR BR=8120
                                                                                                                                                                                                                                                        NERROR=29
                                                                                                                                                                                                                                                                                   9999 CØNTINUE
                                                                                                                                                                                                                                                                     8888 NIX=1
                                                                                                                                           136
                                                                                                                                                                                                                                          8120
45
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SUBROUTINE REGMAT

The segment stiffness matrices, XKS, and the segment load matrices, XLS, are passed from SEGMAT to REGMAT via Tapes #2 and #3, and are placed in the XKRTOT array and the XLRTOT array, respectively. If kinematic links occur between segments in the region, the XKRTOT array and the XLRTOT array are modified to represent the situation. In the case of discrete rings the routine RINGER is called and provides the necessary matrices.

A horizontal and vertical partitioning of the XKRTOT array occurs while the XLRTOT array is subjected to a horizontal partitioning only. Appropriate matrix operations are performed upon the partitions of each array, thus reducing the size of the region stiffness and load matrices and resulting in increased program capacity. The results of these manipulations are the region stiffness matrix, XKR, and the region load matrix, XLR. In passes other than the first pass, first cycle, the load calculations are not performed

Subroutines Called from REGMAT

Subroutine SWITCH: Is a routine used to arrange a matrix in a form convenient for use by another routine employing a positive definite method for solving linear algebraic equations.

Subroutine CHASE: Is a routine used to obtain the solution X of the linear system AX = Y, given at least one right side of Y and the positive, definite, symmetric, real coefficient matrix A.

Subroutine FUTILE: Is a routine called from CHASE and used to obtain the factorization of the positive definite, real, symmetric matrix A into the product of a lower triangular matrix and its transpose by utilizing a Cholesky decomposition.

<u>Subroutine TRIEQ</u>: Is a routine called by CHASE or EIGVAL to solve a triangular system of algebraic equations.

| FORTRAN CODE | ENGINEERING | SYMBOLS (REF. 1) |
|----------------|-------------|--|
| SKL MATRIX | | SKL |
| SKLTR MATRIX | | $\left[\mathtt{SKL}\right]^{\mathrm{T}}$ |
| XKRTOT MATRIX | | K'11 K'12 K'21 K'22 |
| XLRTOT MATRIX | | L'iRl L'jRl L' |
| SKL22 MATRIX | | SKL ₂₂ |
| REGTOT MATRIX | | $\begin{bmatrix} K_{11} & K_{12} \\ K_{21} & K_{22} \end{bmatrix}$ |
| STORE MATRIX | | L _{jRl} L _{jRl} L |
| XK11 PARTITION | | $\begin{bmatrix} \kappa_{11} \end{bmatrix}$ |
| XK12 PARTITION | | [K ₁₂] |
| XK22 PARTITION | | [K ₂₂] |
| XK21 PARTITION | | [K ₂₁] |

| FORTRAN | CODE |
|---------|------|

ENGINEERING SYMBOLS (REF. 1)

XL1 PARTITION

[LR]

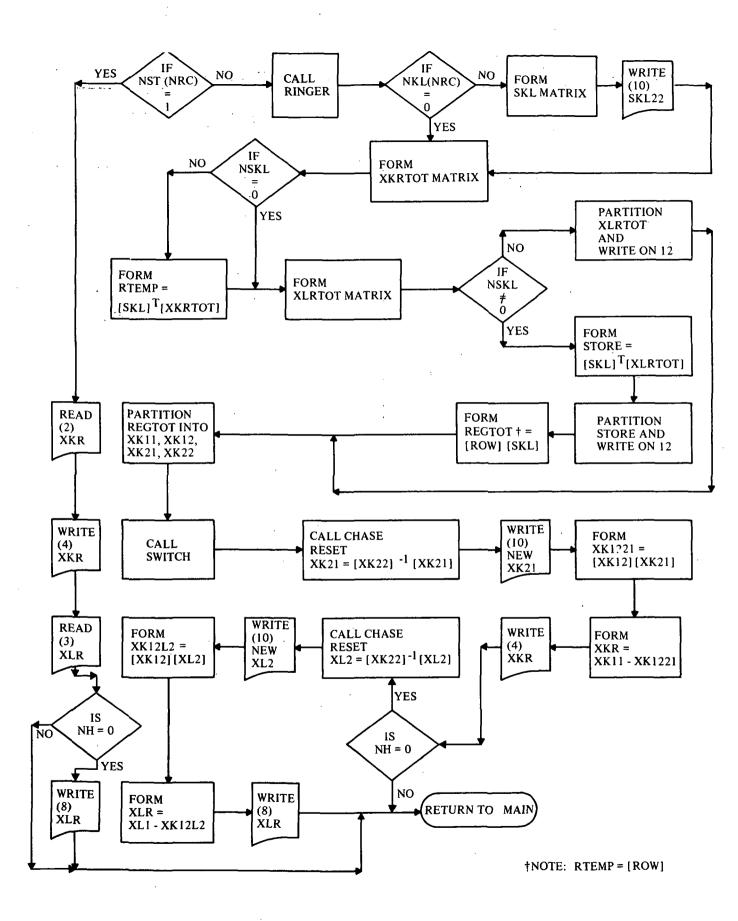
XL2 PARTITION

XKR MATRIX

 $\begin{bmatrix} \mathbf{K}_{\mathrm{R}} \end{bmatrix}$

[L

XLR MATRIX



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900010
900020
900030
900040
900050
900050
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900240
900240
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900270
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                                                                                                       COMMON STORY(16), XMAT(11C, 10), STD(10), SADUS(30), RADUS(30)
COMMON TADUS(30), UADUS(3C), SAVTIC(900)
COMMON XN, TEFREE, TIC, PHI, STOP, RESTOP, RTICK, GI, XNL(3), NH
COMMON NST(30), NKL(30), NXMAT(20), SAVSTP(30), SAVSTP(30), SRTIC(30)
COMMON USTOP(30), NREG, NPPT, NKC, NSC, NIX, IERROR, KGEOM, IGEOM, ISTTAB
COMMON KELVIN, 10EGIN, NPPOB, NSEG, NERROR, 9, THICK, NØJS, NLINKS, NLCASE
COMMON (2072/ PRINT
                                                                                                                                                                                                                                                                                                                                                                                                                      DIMENSION XEEP(8,8) SKL(120,120), SKLTR(120)

DIMENSION XEEP(8,8)

UMENSION XEEP(8,8)

UMENSION XEEP(120,120), REPP(120), XLRIDI(120,2), XKEEP(8,2)

UMENSION XED(122,120,2), REW(120), HOLC(4,120)

UMENSION XEZ(112,112), XKI1(8,8), XKRI2(8,112), XK21(112,8)

UMENSION XEI(8,2), XK122(8,8), XKRI2(8,2)

UMENSION XEI(18,2), XK122(18,8), XKR(8,2)

UMENSION NOTOT(4,4), RNGLOC(4,28), JNG(28), RNLED2(4,28)

UMENSION NOTOT(4,4), RNGLOC(4,28), JNG(28), RNLED2(4,28)

UMENSION NOTOT(4,4), RNGLOC(4,28), JNG(28)

UMENSION NOTOT(4,4), RNGLOC(4,28), JNG(28)

EQUIVALENCE (LABEL(1), XK122(1), HULD(1), LOEP(1))

EQUIVALENCE (LABEL(1), NN(1)), (LABEL(1), NN(1))

EQUIVALENCE (LABEL(1), NN(1)), (LABEL(1), NN(1))

EQUIVALENCE (LABEL(1), XK121(1), XK22(1), XK1V(1)), (LABEL(15), NB(1))

EQUIVALENCE (LABEL(13), X(1)), (LABEL(15), NB(1))

EQUIVALENCE (SKL(1), XKRIQ(1), XKRIV(1), XLNIV(1)), XLRIV(1), X
                                                                                                                                                                                                                                                                                                                                                                  COMMON '/PLS' DMEGA, IMORD, XMERC, XPRES, XMENT, AZERO, ADNE, ATWO DIMENSION OPEN(4,4)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              DØUBLE PRECISIØN SAVTIC,TIC,PHI,STØP,RESTØP,RTICK
DATA NI
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        EQUIVALENCE (SKLTR(1), REGTØT(1), ØPEN(1), XKL2(1))
EQUIVALENCE (STØRE(1), XL2(1), XK21(1))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             (NH.NE.O.AND.IBEGIN.NE.1) GB TØ 690
                                                                                                                                                                                                                                                                                                                                               COMMON /ARING/ NRING(28), AMAT(30,4)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        /BHFBRCE 21/
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   /BHFBRCE RI/
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              PHMBMENT 2
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        / BHF BRCE
                                                         INTEGER SAVJTC, SAVSTP, Q, THICK
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               RTEMP(1), ROW(1))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  NOJ = NST(NRC) + NKL(NRC) +1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  (NST(NRC).EQ.1) GBTØ 1
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      NKIV = NJINK4 - 8
                           SUBRBUTINE REGMAT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                NØJ4 = NØJ*4
NSKL = NKL(NRC)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    CON#5HN=5HNICN
                                                                                 INTEGER XN1, XN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            PRINT = 0.0
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             REWIND 12
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          DATA N1
DATA N2
DATA N3
CATA N4
CATA N4
DATA N5
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FBR, IS
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| | WRITE(6,1726) | 900600 | - |
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| 726 | T(1H1) | 900610 | |
| 189 | FRIECOSOLI MACSARIANNA. FORMAT(////SIX31HINPUT DATA FOR SEGMENT COUPLING///25X14HREGION NU | 9006 | |
| _ | ER ,12,5X25HNUMBER BF SEGMENT JBINTS ,13,5X,26HNUMBER BF KINEM | 900640 | |
| •• | Š | 9006 | |
| , | 5 | 099006 | |
| 789 | 16417 | 900670 | |
| | 5 = 31 100 | 069006 | |
| | P= S | 900700 | |
| | 6,684) 1,KT | 01 2006 | |
| 684 | FBRMAT(43X,2(13,16X),13) | 900720 | |
| 683 | CONTINUE | 900730 | |
| 069 | CONTINUE TOWN | .900740 | |
| | 350 I= | 960760 | |
| | - | 900770 | |
| 350 | 0.0=((,1) | 900780 | |
| 160 | FBXMAI (315) 1644) | 06/006 | |
| | AD(2) ((XT | 900810 | |
| | = SAVJTC | ~ | |
| | JZ = SAVSTP(NS) | 900830 | |
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| | (31.61.32) | 900860 | |
| | 08 910 1 = 1,8 | 900870 | |
| |] # CT | 900880 | |
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| 156 | | 086006 | |
| | · c | 901000 | |
| | J=1,4 | 901010 | |
| 196 | ØPEN(I,J) ≈ XTEMP(I,J) | 901020 | |
| 952 | | 901040 | |
| | בר ביים ביים | 9 | |
| | 00 962 1≅1,4 00 962 1≡1,4 | 901070 | |
| 396 | 1.1 | 901080 | |
| 6 20 | 92 1 | 901090 | |
| 664 | | 901110 | |
| | ٥, | , | |
| | J=1,4 | _ | |
| 963 | SPEN(I+J) = XTEMP(I+4+J) | 901140 | |
| 954 | د ، | | |
| | TT = 0 | 117 | |
| | 00 964 [=1,4 00 964 [=1,4 | 901180 | |
| 496 | EN (1,) | • ~ | |

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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            IF (NH.EQ.O) WRITE(6,685)
685 FØRMAT(//60X13HSEGMENT LINKS//43X8HJØINT(J)5X8HJØINT(I)5X20HANGLE
                                                                                                                                                                                                CALL RINGER (G.XN,RNGTØT,RNGLØD,J,RADUS,TADUS,SAVJTC,SAVSTP,JTNØ,
KBC,XNL,MFLG,NSEG,RNLØD2)
                                                                                                                                                                                                                                                     DØ 220 IK=1,4
XKRTØI(JT+1,JT+1K) = XKRTØI(JT+1,JT+1K)+RNGTØI(I,IK)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      WRITE(6,686) JDEP(NRIG), JIND(NRIG), ANGLE(NRIG) 686 FØRMAT(45%, 13,10%, 13,11%, E14.7) FF (JIND(NRIG), GE, JDEP(NRIG)) GØ TØ 8797
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    DB 103 NRIG = 1,NSKL
IF (Q.EQ.1) GB TB 566
READ(5,503) JDEP(NRIG),JIND(NRIG),ANGLE(NRIG)
503 FBRMAT (212,E14.7,1544)
                                                                                                                                                                                                                                                                                                                                                                                                                                                      WRITE(12) ((XKRIØT(1,J),J=1,N@J4),I=1,N@J4)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           WRITE(1) JOEP(NRIG), JIND(NRIG), ANGLE(NRIG)
                                         XKRTØT(IX,JX) = XKRTØT(IX,JX) + BPEN(I,J)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        566 READ(1) JDEP (NRIG), JIND(NRIG), ANGLE (NRIG)
103 CONTINUE
                                                                                                                                                                                                                                                                                                                                                                                    DØ 5504 I=1,NØJ4
WRITE(2) (XKRTØT(I,J),J=1,N@J4)
                                                                                                                            IF (NRING(NRC).EQ.0) G0 TØ 210
IF (Q.EQ.5) WRITE(6,300)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           IF(1).Eq.JDEP(N)) 68TØ 11
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        IF (9.EQ.5) READ(5,2000)
                                                                                                                                                                                                                                                                                                                                                                  IF (NSKL.NE.O) GB TB 931
                                                                                                                                                                                                                                                                                             IF (Q.NE.5) GØ TØ 210
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 DB 100 IJ = 1,NBJ
I = 4+13-3
                                                                                                                                                                                                                             = 4*(JTNB(J)-1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  DØ 501 J=1,NJTNH4
DØ 501 I=1,NJTNH4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ISF BRIENTATION//
                                                                                                             NRNG = NRING(NRC)
                                                                                                                                                                                   UB 211 J=1, NRNG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              SKL(1, 3)=0.0
00 956 I=1,4
                                                                                                                                                                                                                                                                                                               WR ITE (6, 300)
                                                                                                                                                                                                                                                                                                                            READ(5,2000)
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                                                     957 JX = JX + I
                                                                                                                                                      FURMAT ( / / / )
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    GB TØ 103
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         2000 FØRMAT(1X)
                                                                                                                                                                                                                                                                                                                                                                                                                             GB TØ 101
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                                                                                960 CONTINUE
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                                                                                                                                                                                                                               READ(12) -((XKRTØT(1,J),J=1,N@J4),I=1,N@J4)
                                                                                                                                                                                                                                                                                                                     ( J ) + SKLTR (K ) * XKRTØT (K , J )
                                                                                                                                                                          WRITE(10) (SKL(1,J),J=5,JJ)
D8 702 J=1,NJINK4
WRITE(2) (SKL(1,J),1=1,NBJ4)
REWIND 2 ...
                                                                                                                            FØRMAT(1H ,8(E14.7,2X)/(5X,8(E14.7,2X)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                      READ (3) ((XKEEP(1,J),J=1,NPRBB),I=1,8)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XLRIBT(IL, J) = XLRIBT(IL, J) + XKEEP(I, J)
                             SKL( I', J) = RADUS(JD)/RADUS(JI)
SKL(I+1,J+3) =-(RADUS(JD)-RADUS(JI))
SKL(I+2,J+3) =-SKL(I+1,J+3)*C0TAN
JI = JIND(N)
COTAN = COS(ANGLE(N))/SIN(ANGLE(N))
IF(N.LI.NRIG) N=N+1
                                                                                                                                                                                                                                                                                                                       KTEMP (J)=RTEMP (J)+SKLTR(K)*
WRITE(12) (RTEMP (J),J=1,NØJ4)
                                                                                                                                                                                                                                                              DB 740 I=1,NJINK4
READ(2) (SKLTR(J),J=1,NDJ4)
DB 741 J=1,NBJ4
RTEMP (J)=0.0
                                                                                                                                                                                                                                                                                                                                                              1F (NPRBB.EQ.0) GB TB 1001
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              971 11 = 11,111
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      II = (JST0P-1)*4 + I
                                                                                                            SKL([+3,J+3] = 1.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            971 J=1,NPRBB
                                                                                                                                                                                                                                                                                                                                                                                                                                 JTIC = SAVJTC(NS)
JSTØP= SAVSTP(NS)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                            GØTØ (981,982),N
                                                                                                                                                                                                                                                                                                                                                                                                  DØ 436 J=1,NPRØB
                                                                                                                                                     JJ = NJINK4 - 4
DØ 768 I=5,11
                                                                                    SKL(I+1, J+1) =
                                                                                                                                                                                                                                                                                                                                                                                        DB 436 I=1,NBJ4
                                                                                                                                                                                                                                                                                                                                                                                                            XLRTØT(1,3)=0.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  IF (N.EQ.2) I=4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  DØ 971 N =1,2
                                                                                                                                                                                                                                                                                                           DØ 741 K=1,NØJ
                                                                                                                                            4 - 400N = 11
                                                                                               SKL(1+2, J+2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  111=111 +13
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                                                                                                                    CONTINUE
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                                                                GBTØ 13
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| | IF (IWERD.GE.3) XLRIBI(J1+1.NPRBB) = XLRIBI(J1+1.NPRBB)+ | 902421 |
|--------|--|---------|
| | RNL@D2(1.4) | 902422 |
| 227 | CONTINUE | |
| 777 | | 063500 |
| 277 | | 0064306 |
| 230 | _ | 902440 |
| | REMIND 3 | 902450 |
| ; | 1F (NSK1.NE.D) G010 147 | 902460 |
| | 119 1=1.4 | 024206 |
| 110 | TF(3) (X | 902480 |
| | 10 TO THE TOTAL TOTAL TO THE TO | 007200 |
| | ENGINEERS NOTES | 201726 |
| | TOTAL STATE | 005206 |
| 118 | WRITE(3) (XLRIBI(1, J), J=1, NPREB) | 902510 |
| | | 902520 |
| | 00 .117 I=5,M4 | 902530 |
| 117 | | 902540 |
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| • | 100 | 902560 |
| 1.4.7 | | 002570 |
| - | TANDENIA TO | 00000 |
| | LONE INCOME | 902300 |
| • | 0 10 0 | 007600 |
| • | WKE(1,3)=0 | 000706 |
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| | 1F (NSKL-E0.0) GØ 1Ø 102 | |
| | ((SKL(1, J), J= | .902750 |
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| | 750 I=1,NJINK4 | 902770 |
| | 0(12) (| 902780 |
| | J=1,NJINK4 | 902790 |
| | C1 1015 | 902800 |
| • | X=1,0004 | 902810 |
| S O | (J)=REGIØI (J) | 902820 |
| | SIBI(J) JUHI NAINKA) | 058206 |
| ء د | GO, LOOP REARRANGE | 049706 |
| _ | NJ ENRA? | 00200 |
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| | 429 | 902880 |
| 626 | 11 CINK JAK | 902890 |
| | , | 902900 |
| | XX12(INK,KIX)=0.0 | 902910 |
| | XK21-(KIX, INK)=0.0 | 902920 |
| 625 | z | 902930 |
| • | 627 KIX=1 | 040206 |
| . 427 | UN 024 LAA=1940 YK22/KTX-1 AX3=0 | 902960 |
| 70 | • | 902970 |
| | KBUNT=-8, | 902980 |
| | INK3= | 902990 |
| | DØ 780 N=1,NJINK | 903606 |

| D(1,J),J=1,NJINK4) .0R.NREAD.GE.NJINK3)GØ TØ 790 KK | 1 2 10 793 0 794 | 10 | נונר. (נונר, |
|---|--|---|---|
| AD+11 1+4 1+4 (HØL (HØL 1+12 KK+K KK+K | IRBW=IRBW+1 XK22(IRBW+1)=HBLD(K*L) GB TB TB TB IF(NREAD-EQ-1)GB TB T9 IF(NREAD-EQ-2)GB TB T9 IF(NREAD-EQ-NJINK3)GB IF(NREAD-EQ-NJINK)GB T DB T96 J=1,4 XKII(I,4)=HBLD(I,5) JJ=J+4 |)=H@LD([,,JJ) 1,4 1,4 1,4 1,4 1,4 1,6 1,6 | KCME-4 KG-M8-8 DØ 798 J=M11,M8 KG-KG+1 XK22(KRØW,K8)=HØLD([1,J) JJ=1+4 KK=K8+4 KK2(KRØW,KK)=HØLD([1,JJ) JJS-1+8 KCØL=KCM+1 798 XK21(KRØW,KCØL)=HØLD([1,JJJ) CØ TØ 78C TØ KRØW=4 M4=NJNK4-4 M4=NJNK4-7 DØ 799 I=1,4 KKØW=KRØW+1 K4=KEND-4 |

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11,7x,8HDELTA R1,7x,7HTHETA 1,8x,8HDELTA T2,7x,8HDELTA 22,7x,8HDELT
2A R2,7x,7HTHETA 2)
111=0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            WRITE(6,688) (LABEL(1), I=II, III), (XKR(M,J), J=1,8)
                                                                                                                                                                                                                                                                                        UW 81 J=+8
UW 81 F=1.8
XK1221(1,J)=0.0
DØ 81 K=1.NKIV
XK1221(1,J)=XK1221(1,J)+XK12(1,K)*XK21(K,J)
                                                                                                                                                                                                                                                               WRITE (10) ((XK21(I,J),J=I,8),I=1,M8 )
WRITE (10)(( SAVJTC(I), SAVSTP(I)),I=1,NNT)
                                                                                                                                                                                                                                                                                                                                                                                                                                              XKR(I,J) = (XKR(I,J)+XKR(J,I))/2.0
XKR(J,I) = XKR(I,J)
WRITE (4) ((XKR(I,J),J=1,8),I=1,8)
IF (NH.NE.O.AND.IBEGIN.NE.I) GØ IØ 691
                                                                                                                                                                                                                      CALL SWITCH (XKIV,-NKIV)
CALL CHASE (XKIV,NKIV,XK21,8,112,NIX)
                                                                                                                                                                                XK22(1,K)=(XK22(1,K)+ XK22(K,1))/2.
                                                                                                                                                                                                                                                                                                                                                            DØ 82 J=1,8
DØ 82 I=1,8
XKR(I,J)=XKII(I,J)-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            FORMAT(/1X,2A4,1X,8(E14.7,1X))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 IF(XKR(1,J).GE.0.0)GB TB 138
                                                                                XK11(KRBW, KCØL) = HØLB(1, JJ)
                                                                                                                                                                                                                                                   IF (NIX.LT.0) GØTØ 8841
                                        XK 12(KRØW,K4)=HØLD(I,J)
KCØL=KCØL+1
                                                                                799 XK11(KR8W,KCBL)=HBLL...
780 CBNTINUE
7703 NSING=NKIV*(NKIV+1)/2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         IF(INDEC.EQ.0)G@ TØ 151
IF (NH.NE.0) G@ TØ 151
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   IF ( J.NE. 1) GØ TØ 138
                                                                                                                                                                                              XKIV(1K)=XK22(1,K)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            SYM( I . J ) = XKR( I . J )
KCØL=4
00 799 J=M7,M4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     WRITE(6,5011)
                                                                                                                                                                                                                                                                                                                                                                                                    DØ 650 J=1,7
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      UØ 687 M=1,8
                                                                                                                                                                                                                                                                                                                                                                                                                     K = J+1
DØ 650 I=K,8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   DØ 137 J=1,8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             SYM(1,1)=0.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         DØ 138 1=1,8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      DØ 138 J=1,8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    WR ITE (6, 152)
                                                                                                                                                      UØ 10 K=1,N
DØ 10 I=K,N
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    11=111+1
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                            K4=K4+1
                                                                                                                                                                                                              [K=[K+1
                                                                                                                           N=NKIV
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                                                                                                                                          IK=1
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152 FORMAT(///- ************************* WARNING - NEGATI IVES APPEAR ON MAIN DIAGONAL. REVISE SIZING **************//)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XK12L2(1,J)=XK12L2(1,J)+XK12(1,K)*XL2(K,J)
                                                                                                                                                                                                                                                                                                                                                                                                                                                   KEAD[3] (XL2(I,J),J=1,NPRØB)
CALL CHASE (XKIV,NKIV,XL2,-NPRØB,112,NIX)
IF (NIX.LI.O) GØIØ 8842
WRITE (10) ((XL2(I,J),J=1,NPRØB),I=1,MB
                                                                                                                                                                                                                                                                            HRITE(6,157)
FORMAT(//56X,2!HREGION SYMMETRY CHECK/)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  WRITE(8) ((XLR(1, J), J=1, NPR88), 1=1, 8)
IF (NH.NE.O.AND.18EGIN.NE.1) GØ TØ 150
                                                                                                                                                                                                                                                                 IF (NH.NE.O.AND.IBEGIN.NE.1) GØ TØ 692
                                                                                                 = ABS(SYM(1,J)) - ABS(SYP(J,1))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       FØRMAT(//57X,18HREGIØN LEAD MATRIX/)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               WRITE(6,5000) (XLR(I,J),J=1,NPRØB)
                                                                                                            |F(ALPH) 47,71,48
|F(SYM(1,J).EQ.O.O) GBTØ 71
|SYM(1,J) = SYM(J,I) / SYM(I,J)
                                                                                                                                                  GBT0 43
IF(SYM(J,1).EG.O.O) GBT0 71
SYM(I,J) = SYM(I,J) / SYM(J,1)
                                                                                                                                                                                                                                                                                                    DØ 1730 I=1,8
WRITE(6,5000) (SYM(I,J),J=1,8)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XLR(1, J)=XL1(1, J)-XK12L2(1, J)
                                                                                                                                                                                                                                                                                                                                                    IF (NPRBB.EQ.0) GB TB 15C

DB 819 I=1,4

READ(3) (XL1([1,J),J=1,NPRBB)
                                                                                                                                                                                                                                                                                                                                                                                                   READ(3) (XL1(1,J),J=1,NPRØB)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   NL2=NPRØB
DØ 205 J=1,NPRØB
DØ 205 I=1,8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             DØ 206 J=1,NPRØB
DØ 206 I=1,8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XK12L2(I,J)=0.0
UB 205 K=1,NKIV
                                                                                                                                                                                                   SYM(1,1) = 1.0
SYM(3,1) = 0.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           WR ITE (6, 5012)
                                                               DB 42 II=1,7
                                                                                                                                                                                                                                                                                                                                                                                                                              M8 = NJINK4-8
                                                                                                                                                                                                                                                                                                                                                                                                                                          00 817 I=1,M8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             IERRØR = 8797
                                                                           H = JJ
08 43 I=M,N
                                                                                                                                                                                                                                                                                                                                                                                         00 818 I=5,8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1ERROR=8841
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                                                                                                                                                                                                                                                     CONTINUE
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READ(3) ((XLR(I,J),J=1,NDREB),I=1,8)
WRITE(8) ((XLR(I,J),J=1,NDREB),I=1,8)
150 RETURN
END KK(I,J)+XKR(J,I))/2.0 DØ 651 1=K,8

XKR(1,J) = (XKR(1,J)+XKR(J,I))/2.C

XKR(J,I) = XKR(I,J)

HRITE(4) ((XKR(I,J),J=1,8),I=1,8)

IF (NPRØB.EQ.0) GØ TØ 15G READ (2) ((XKR(I,J),J=1,8),I=1,8) DØ 651 J=1,7

159

GØ TØ 150 8842 IERRØR=8842

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FBR, IS SWITCH, SWITCH

IMAGE = IMAC [NTØ = IMAGE IF (KEY) 180,190,180 180 KEY = 0 GØ TØ 10C

190 RETURN

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SUBRBUTINE FUTILE (A,N,NIX)

NIX = -K GØ TØ 220

210 CBNTINUE NIX = 0 220 RETURN 980 NIX = -K

1F (1 - K) 120,105,120 DENØM = -SUM

60 ASSIGN 8C TØ LEAP 70 II = KI 110 DENØM = -SORT(DENØM) A(IK) = -DENØM

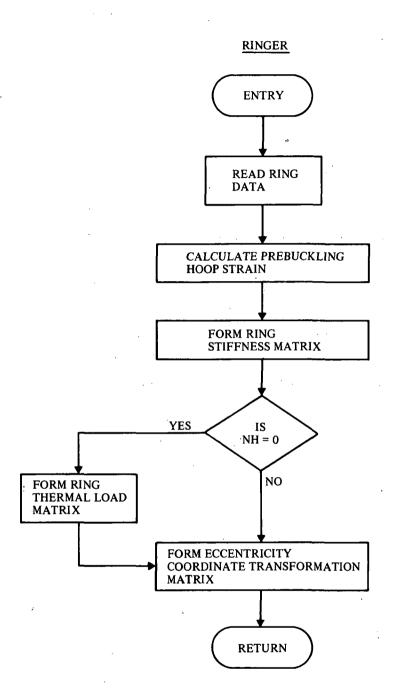
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FOR.1S TRIEG.TRIEG
SUBROUTNE TRIEG(A,Y)
SUBROUTNE TRIEG(A,Y)
REAL A(1),Y(1)
COMMON / MITER/INDICS
LI = LI
F (INDICS) 130,100,100
LI = LI
F (INDICS) 130,100,100
LI = LI
F (MML = M - LI)
LI = LI
L
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SUBROUTINE RINGER

This subroutine reads the discrete ring geometric data, and temperatures, and forms the ring stiffness, mass, and thermal load matrices. These matrices are passed back to either of subroutines REGMAT or STRMAT (see next) as necessary, for incorporation into the region or structure matrices, respectively. The effects of static prestress are considered, and the load calculations are omitted in passes involving eigenvalue extractions.

The calculations in RINGER account for the eccentricity of the ring centroid from the base shell wall, and the offset of the ring centroid from the shear center.

| FORTRAN CODE | ENGINEERING SYMOBLS (REF. 1) |
|---------------|---|
| RNGTOT MATRIX | $\left[^{\mathrm{k}}\mathrm{_{R}}\right]$ |
| TDEL MATRIX | $\left[\begin{smallmatrix} \mathbf{T} \\ \Delta \end{smallmatrix} \right]$ |
| RNGLOD MATRIX | $\left[\iota_{_{ m R}} ight]$ |
| RC | r _c |
| RS | r _s |
| xc | x _c |
| YC | x _s |



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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     READ(5,213) JINB(J), EA, EIY, EIXY, GJ, EIX, ALPR, RC, XC, YC, XBAR, YBAR, XI,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        1
300 FBRMAT(/55X,-RING AT JØINT NR. -,12//- EA =-,1PE12.5,6X,-EIY =-,
1 IPE12.5,5X,-EIXY =-,1PE12.5,4X,-GJ =-,1PE12.5,6X,-EIX =-,1PE12.5,
2 5X,-ALPR =-,1PE12.5/- RC =-,1PE12.5,6X,-XC =-,1PE12.5,6X,-YC =-,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             3 | PEI2.5,6X,-XBAR =-,|PEI2.5,4X,-YBAR =-,|PEI2.5,4X,-YC =-,
4 | PEI2.5,-XB =-,|PEI2.5,4X,-YBAR =-,|PEI2.5,4X,-XI =-,
5 - TFREE =-,|PEI2.5,3X,-RB =-,|PEI2.5,6X,-TB =-,|PEI2.5,6X,-G =-,|PEI2.5,G =-,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 WRITE(6,300) JINB(J), EA, EIY, EIXY, GJ, EIX, ALPR, RC, XC, YC, XBAR, YBAR,
                                                                                                                                                                                                                                      DIMENSION RNGTOT (4,4), RNGLØD(4,28), TDEL (4,4), XKTØT(4,4), XL(4)
DIMENSION ADUS(30), BADUS(30), JTIC(30), JSTØP(30), JTNØ (28), XNL(3)
DIMENSION RNLØD2(4,28)
FBR,IS RINGER,RINGER
SUBRBUTINE RINGER (G,XN,RNGTØT,RNGLØD,J,ADUS,BADUS,JTIC,JSTØP,
1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       AMN = (TI-T0)/(XI-X0)
BN = ((T2-TF)*XI-(TI-TF)*X0)/(XI-X0)
WRITE(I) JIN0(J),EA,EIY,EIXY,GJ,EIX,ALPR,RC,XC,YC,XBAR,YBAR,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              212 READ(I) JINB(J), EA, EIY, EIXY, GJ, EIX, ALPR, RC, XC, YC, XBAR, YBAR,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                F (IMBRD.EQ.3.BR.INBRD.EQ.5) EPSIL2 = EPSIL1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1
213 FBRMAT(12,5E14.7/6E12.5/5E14.7/3E14.7)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                EPSIL = (XI*EPSILL+X2*EPSIL2)*RC/RBJ
                                                                                                                                                                   COMMON /ARING/ NRING(28),AMAT(30,4)
COMMON /PLS/ OMEGA,IMORD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    AMN, BN, RØJ, RHØ, E
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            F (MFLG.EQ.2) GØ TØ 102
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 AMN, BN, RØJ, RHØ, E
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             WØPI = 2.0*3.1415927
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     IF (Q.EQ.1) GØ TØ 212
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            EPSIL1 = AMAT(K,1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         EPSIL1 = AMAT(K,3)
EPSIL2 = AMAT(K,4)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               EPSILZ = AMATIK,2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     RHB*BMEGA
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               RCS3 = RCS*RS2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             = AM2#AM2
                                                                                                                               INTEGER Q, XN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     xy = EIXY/E
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      AM2 = AMBAM
                                                                                                                                                                                                                                                                                                                                                       XI = XNL(1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        K = JTN8(J)
                                                                                                                                                                                                                                                                                                                                                                                              = XNL (2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           153 = RS2#R
                                                                                                                                                                                                                                                                                                                                                                                                                                  x_3 = x_NL(3)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               KC2 = XC*X
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                                                                                 1.0/RCS*(EA*YC*AM2*(XC*AM2/RS2-1.0/RS)+EIY*YC*AM2/
(RC2*RS)*(AM2-1.0)+EIXY*AM2/RCS*(AM2-1.0))
-RBM*XY/RC2*AM2*X3
                                                                                                                                                                                                                                                          = AM4/RCS3*(EA*YC2+EIY*YC2/RC2+EIX+2.0*EIXY*YC/RC)+
                                                                                                                                                                                                                                                                                                                                                             = AM2/(RS2*RC)*(YC2*(EA+EIY/RC2)+EIX+2.0*EIXY*YC/RC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 = 1.0/RCS*(YC2* EA+EIY*YC/RC+EIX+2.0*EIXY*YC/RC)+
RNGTØT(1,1) = 1.0/RCS*(EA*(XC2*AM4/RS2-2.0*XC*AM2/RS+1.0)+
EIY/RC2*(AM4-2.0*AM2+1.0))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1.0/RCS*EPSIL*(EA*(-YC2)+(EIY+EIX)*AM2-EIX)
                                                                                                                                                                     = 1.0/RCS*(EA*YC*(XC*AM2/RS-1.0)+EIY*YC/RC2*
(AM2-1.0)+EIXY/RC*(AM2-1.0))
                                                                                                                                   EA*AM/RS2*(-XC*AM2/RS+1.0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         RNGLØD(3,J) = 0.0
RNGLØD(4,J) = -TEM1*YC-EIXY*ALPR*AMN/RS
                                                                                                                                                                                                                                                                                                                          RNGTØT(3,2) = -EA+YC+AM2+AM/(RS2+RS)
                                                                    -RBM* (A+Y/RC2*AH2) *X3
                                                                                                                                                                                                                                                                                                             -RBM* (A+X/RC2*AM2) *X3
                                                                                                                                                                                                                                                                                                                                                                                                                                RNGTØT(2,3) = RNGTØT(3,2)
RNGTØT(3,3) = EA*AM2*RC/(RS2*RS)
                                                                                                                                                                                                                                                                                                                                              -ROM*XY/RC2*AM*X3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  -RBH* (A+Y/RC2) #X3
                                                                                                                                                        -ROM*Y/RC2*AM*X3
                                    +EAPS*AM2*RC/RS3
                                                                                                                                                                                                         -EAPS#AM2#YC/RS2
                                                                                                                                                                                                                                                                           GJ*AM2/(RS2*RS2)
                                                                                                                                                                                                                                                                                                                                                                                                 +AM2/RCS*EAPS*XC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  -AM*XBAR/IRS*XBRS)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               = -AM*YBAR/(RS*XBRS)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        AMN*XC+BN)/RS
                                                                                                                                                                                                                                                                                             +AM2/RCS+EAPS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 RNGTØT(4,3) = -EA*YC*AM/RS2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       -ROM* (X+Y) *X3
                                                  -EAPS*RC/RS3
                                                                                                                                                                                                                          +EAPS+YC/RS2
                                                                                                                                                                                                                                                                                                                                                                                                               RNGTØT(1,3) = RNGTØT(3,1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  = RNGTØT(4,2)
                                                                                                                                                                                                                                          = RNGTØT(2,1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   RNGTØT (4,1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    = RNGTØT (4,3)
                                                                                                                                                                                                                                                                                                                                                                                +GJ#RC/RS)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     6J*AM2/RS2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        DEL(3,1) = -1.0/xBRS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       IF (Q.EQ.1) GB TB 400
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       RNGLØD(1,J) = TEM1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            KBRS = 1.0-XBAR/RS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        EM1 = EA#ALPR#
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            IDEL(1,1) = 0.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             0EL(2,1) = 0.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   DEL(2,3). = 0.0
                                                                                                                                        H
                                                                                                                                                                RNGTØT(4,1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      DW 813 L=1,4
                                                                                                                                                                                                                                       RNGTØT(1,2)
                                                                                                                                                                                                                                                                                                                                                              RNGTØT(4,2)
                                                                                                                                    RNGTØT(3,1)
                                                                                   RNGTØT(2,1)
                                                                                                                                                                                                                                                         RNGTØT (2,2)
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    RNGTØT (3,4)
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3301300
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                                                                      = RNGTØT(L,M)+TDEL(N,L) *XKTØT(N,M)
XKTØT(L,M) = XKTØT(L,M)+RNGT@T(L,N)*TDEL(N,M)
DØ 814 L=1,4
                                                                                                                                                                                                                                                                                                                                                 DØ 1101 L=1,NSEG
IF (JTNØ(J),EQ.JSTØP(L)) GØ TØ 1106
                                                                                                                              (L) = XL(L)+TDEL(N,L)*RNGLBE(N,J)
816 L=1,4
                                                                                                                                                                                                                                                        DØ 1100 L=1,NSEG
IF (JTNØ(J),EQ,JTIC(L)) GØ TØ 1105
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  = RNLBD2(L,J)*RMULT
                                                                                                                                                                                                                                                                                                                                                                                                                                                      RNGTØT(L,M) = RNGTØT(L,M)*RMULT
                                                                                                                                                                                                    RNLØD2(2,J) = 0.0
RNLØD2(3,J) = -RØM*RC*A
RNLØD2(4,J) = YBAR*RNLØD2(3,J)
                                                                                                                                                                                                                                                                                                                                                                                     M = JSTØP(L)
RMULT = BADUS(M)*TWØPI
                                                                                                                                                                                                                                                                                                                       RMULT = ADUS(M) +TWBPI
                                             RNGTØT(L,M)
                                                                    RNGTØT(L,M)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             RNGLØD(L,J)
                                                                                                                                                                                                                                                                                                          M = JTIC(L)
                                                        DØ 814 N=1
                                                                                                                                                                                                                                                                                                                                    GØ TØ 1111
                                                                                                                                                                                                                                                                                                                                                                          CONTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                CONTINUE
                                                                                                                                                                                                                                            CONTINUE
                                                                                                                                                                                                                                                                                  CONTINUE
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                                                                                                                                                                                                                                                                                  1100
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SUBROUTINE STRMAT

The region stiffness matrices, XKR, and the region load matrices, XLR, are passed from REGMAT to STRMAT via Tape #4 and Tape #8, and are placed in the XKSTOT array and the XISTOT array, respectively. A matrix, BCD, is formed to represent the boundary conditions, and, if kinematic links occur between regions, the RKL matrix is developed to represent this situation. The subroutine RINGER is again called for discrete ring matrices. In passes other than the first pass, first cycle, the load calculations are not performed.

As a result of appropriate matrix operations, a reduced structure stiffness matrix is formed. In passes other than the first pass, first cycle, STRMAT terminates here. In the first pass, first cycle, the following calculations are made. Subroutine FLEX, a routine identical to SREVN2 (except for being in single precision) with the name changed due to the structure of the OVERLAY option, is called to invert the structure stiffness matrix thus producing A, the flexibility matrix for the structure. The region end deflection array, DRE, is produced as the result of another set of matrix operations.

| FORTRAN | CODE |
|-----------|------|
| LOMETICAL | |

ENGINEERING SYMBOLS (REF. 1)

BCD MATRIX

BCT MATRIX

XST MATRIX

XKF MATRIX

A MATRIX

XSL MATRIX

XLS ARRAY

XFL ARRAY

DRE ARRAY

[BC]

 $[BC]^T$

(K)_T

(K)_F

A_F

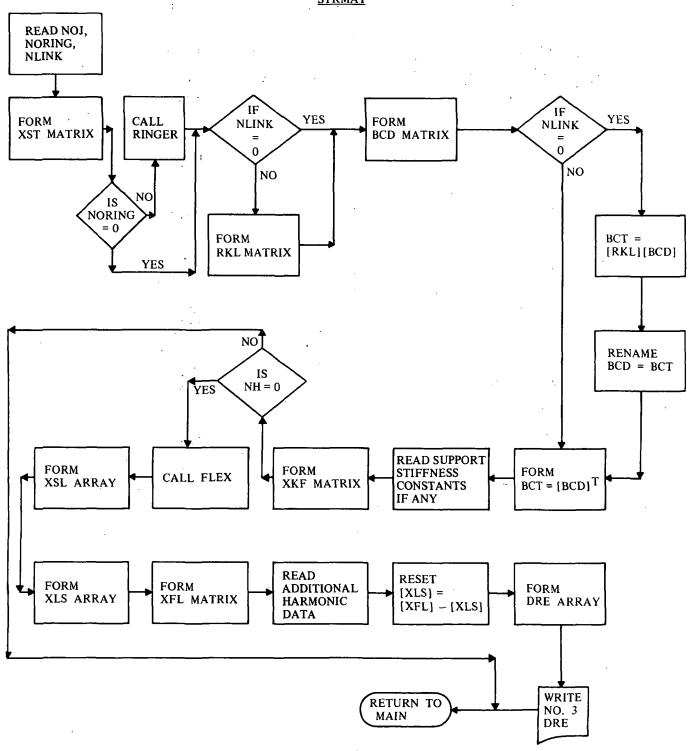
(L)

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                                                                                                                                      DOUBLE PRECESSION SAVTIC, TIC, PHI, STOP, RESTOP, RTICK
COMMON STORY(16), XMAT(110,10), STO(10), SADUS(30), RADUS(30)
COMMON STORY(16), XMAT(110,10), SADUS(30), RADUS(30)
COMMON TADUS(30), UADUS(30), SAVIT(500)
COMMON NST(30), NKL(30), NKMAT(500), NKMAT(500)
COMMON NST(30), NKMAT(300, SAVJTC(30), SAVSTC(30), JRTIC(30)
COMMON NST(30), NKMC(30), NKMAT(30, NY, IERROR, GGM, IGEOM, IGEOM, ISTAB
COMMON NST(30), NREG, NPPT, NRC, NSC, NIX, IERROR, GGM, IGEOM, ISTAB
COMMON NST(40), NREG, NMPT, NRC, NSC, NIX, IERROR, NGS, NLINKS, NLCASE
COMMON NSKL, NZ, NBCT, LIND, MAT(30,4)
COMMON NSKL, NZ, NBC, IZB, MAT(30,4)
COMMON NSKL, NZ, NBC, IZB, MAT(30,4)
COMMON NSKL, NZ, NBC, IZB, NSC, IZB, SAM, NKR(128), BC(128)
COMMON NSC, IZB, NSC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    EQUIVALENCE (XKR(1), XLR(1), BC(1), BCT(1), BCA(1), TEMP1(1), LØC(1))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  EQUIVALENCE (XST(1), BCD(1), A(1), XSTBC(1), RKL(1), XLS(1))
EQUIVALENCE (XSTR(1), XKF(1), XFL(1), XSL(1), DRE(1), SCLA(1),
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FØRMAT (315,16A4)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         IF (NPRØB.EQ.O.AND.NH.NE.O) GØ TØ 1700
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                EMP(1), 0PEN(1))
                                                                       INTEGER SAVJTC, SAVSTP, Q, THICK
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            READ(5,101) NØJ,NØRING,NLINK
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       CB . 4HLUMN/
                                       SUBRBUTINE STRMAT (ICYC)
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I=1, NJTNH4
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NLINKS = NLINK
NRINGS = NØRING
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CONTINUE
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FOR, IS STRMAT, STRMA
                                                                                                          INTEGER XN1, XN
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2niixbhjoint(i)iixbhjoint(j)//)
D0 340 i=1.nreg
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             FBRMAT(///51x30HINPUT DATA FBR REGIBN. CBUPLING///31X24HNUMBER BF
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         CALL RINGER (Q.XN,RNGIØT,RNGLØD,J,SADUS,UADUS,JRTIC,JRSTØP,JTNØ,
KBC,XNL,MFLG,NREG,RNLØD2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            GENERATION OF BC BOUNDARY CONDITION SCRAMBLING MATRIX
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XST(JI+I,JI+IK) = XST(JI+I,JI+IK)+RNGTØT(I,IK)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  DØ 107 I=1,NJTNH4
WRITE (2) - (XST(I,J),J=1,NJTNH4)
                                                                                                                                                                                                                                                                                                                                                                                                                                                             XST(IX, JX) = XST(IX, JX) + BPEN(I, J)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             IF, (NØRING.EQ.O) GØ TØ 1170
11=11+1
DØ 460 JK=1,4
GØ TØ (451,452,453,454),JK
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                                                                                                                                                                                                                                                                                                                                                                                                   OPEN(1, 1)=XKR(1+4, 1+4)
                                                                                                                                                                                                                                                                                                       0PEN(1,J)=XKR(1+4,J)
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HDELTA 2,5X,7HDELTA R,5x,7H THETA ,7X,11HANGLE ALPHA)
                                                                                                                                                                                                                                                                         FORMATI //60X, 12HREGION LINKS//43X, 8HJOINT(J), 5X, 8HJOINT(I),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      WRITE(6,2373) JN;II,12,13,14;ANGLE
2373 FØRMAT(/31X,13,9X,12,10X,12,10X,12,10X,12, 7X,E14.7)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          READ (5,110) JN, DLP(1), DLP(2), DLP(3), DLP(4), ANGLE
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                                                                                                                                                                                                                                                                                                                                                                    FORMAT (46X, 12, 11X, 12, 11X, E14.7
                                                                                                                                                                                                                                                                                      15x,20HANGLE BF BRIENTATION)
DB 502 NRIG=1,NLINK
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                              WRITE(6,349) I,KTIC,KSTBP
                                                                                                                                                                                                                                                                                                                                                      WRITE(6,1828) JD,JI,C@TAN
                                           FURMAT (46X, 12, 2(16X, 13))
                                                                                                                                                                                                                                                                                                                       READ(5,503) JD, JI, CØTAN
                                                                                                         56 J=1, NJTNH4
                                                                                                                                                                                                                                                                                                                                      FORMAT (212, E14.7)
                                                                                                                                                                                                                                                             WR ITE(6, 1824)
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ICR =1
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                                                                                                                                                                                                                                                                                                                                                                                OB 126 M=1,NJTNH4
126 READ(4) (BCD(M,N),N=1,NZ)
AT THIS PBINT THE BCD ARRAY IS THE PRODUCT OF RKL AND BCD ARRAYS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           MRITE(14) ((8CD(I,J),J=1,NZ),I=1,NJINH4)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                GB TB 3201
3200 READ(14) ((BCD(1,J),J=1,NZ),I=1,NJTNH4)
3201 CBNTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      TEMPI(M) = 0.0

DØ 181 N=1,NJTNH4

181-TEMPI(M) = TEMPI(M)+XSTR(N)*BCD(N,M)
                                                                                                                                                                                                                                                                                                                                                                                                                                                      DB 124 J=1,NZ
124 WRITE (3) (BCD(I,J),I=1,NJTNH4)
DB 125 I=1,NJTNH4
125 WRITE (3) (BCD(I,J),J=1,NZ)
REWIND 3
                                                                                                                                                                                                                                                     DØ 783 N*1,NJTNH4
READ(NTRKL) (TEMP(M),M=1,NJTNH4)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          DØ 3300 J=1,NZ
3300 WRITE(14) (BCD(1,J),1=1,NJTNH4)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      DØ 183 II=1,NJTNH4
READ (4) (XSTBC(II,JJ),JJ=1,NZ)
                                                                                                                                                                                                                                                                                                          DØ 782 I=1,NJTNH4

BCT(J)=BCT(J)+TEMP(I)*BCC(I,J)

BCT(J)=BCT(L),L=I, NZ)

REMIND NIRKL

REWIND-4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                00 182 N=1,NZ
READ(NBCT) (BCT(J),J=1,NJTNH4)
00 185 - M=1,NZ
     DØ 180 L=1,NJTNH4
READ (2) (XSTR(J),J=1,NJTNH4)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          WRITE(4) (TEMPI(I), I=1,NZ)
CONTINUE
                                                                116 BCD(117, ICR) = SIN(ANGLE)
...BCD(11+1, ICR) = -CØS(ANGLE)
5010 118
                                                                                                                                                                                                                                       IF (NL INK.EQ.0) GB TB 3124
                                                                                                          117 BCD(11-1, ICR)=CBS(ANGLE)
BCD(11, ICR)=SIN(ANGLE)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         . ' '08 184' H=1,NZ
                                                                                                                                                                                                                                                                                DØ 782 J=1;NZ
                                                                                                                                                                                                READ(5,2000)
                                                                                                                                                                                                              ICR=ICR-1 .
NZ=ICR-::.
                                                                                                                                        ICR=ICR+1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          REWIND 4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    REMIND 4
                                                                                                                                                                   CONTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  184 CONTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                          3124 CONTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               REWIND 3
                                                                                                                                                                                  CONTINUE
                                                                                                                                                      I+I = I I+I
                                                                                                                                    118
113
121
109
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783
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502520
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                                                                                              (NPASS.EQ.2. AND. (IMBRD.EQ.1.BR.(XNI.EQ.O.AND.(IMBRD.EQ.3.BR.
                                                                                                                                                                                                                                                                                                                                   FORMAT(50X, 29H THE REDUCED STIFFNESS MATRIX/)
                                                                                                                               IF (ICYC.NE.1.AND.NPASS.EQ.2) GB TB 182
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       WRITE(6,1726)
WRITE(6,1729)"((CØLTTL,ICØL(M)),M=1,MM)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ,8(2A4,1X,13,3X)/)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      F (NH.NE.O.ØR.NLCASE.EQ.O) GE TØ 7
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 805 TEMP(M) = TEMP(M) + BC(N) + A(N,M)
716 CONTINUE
DØ 186 K=1,NJTNH4
186 KKF(M)=KKF(M)+BCT(K)*XSTBC(K,M)
185 CØNTINUF
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          CALL FLEX (A,NZ,SCLA,124,NIX)
                                                                                                            IMBRD.EQ.51111 GB TB 182
                                                                                                                                                                                                                                                                                                                                                                                                                                                   (JJJ.GT.NZ) MM=8-(JJJ-NZ)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       IF(NUMBER.LT.55) GØ TØ 1722
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         WRITE (2). (TEMP(1), I=1,NZ)
                                                              (XKF(1), [=1,NZ)
                                                                              IF (NPASS.GT.2) GØ TØ 182
                                                                                                                                                 WRITE(11) (XKE(:1), I=1,NZ)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         IF(JJJ.NE.NZ) GB TB 1725
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          IF (NIX.NE.O) GB TB 8777
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       FØRMAT (3X, 13,4X, 8(E14.7
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          READ(3) (BC(1), [=1,NZ)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            (EMP(H) = 0.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          DØ 805 N=1,NZ
                                                                                                                                                                                                                                                                                                                   WRITE(6,2365
                                                                                                                                                                                                                                                                 READ(4) (A(
                                                                                                                                                                                                                                                                                                                                                                                                                      + [[[ = [[[
                                                                                                                                                                                                                                                                                                                                                   NUMBER = 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         NUMBER = 3
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                                                                                                                                                                   CONTINUE
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                                                                                                                                                                                                                                                                                                                                                                        1226 XSL(JT+I,IK) = XSL(JT+I,IK)+RNGL@D(I,J)
IF (IW@RD:GE-3) XSL(JT+I,NPR@B) = XSL(JT+I,NPR@B)+RNL@D2(I,J)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       120HPBINT BF APPLICATION, 7X, 12HAPPLIED LEAD//)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              WRITE(6,342) JEXT2,JEXT1,XFL(JEXT1,JEXT2)
FORMAT(41x,13,22X,13,15X,E14.7)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  READ(5,305) JEXT2, JEXT1, XFL (JEXT1, JEXT2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   IF (IMBRD.EQ.3.8R.INBRD.EQ.5) GB TB 306
READ(5,302) LINLBD.(STBRY(!),I=1,16)
302 FBRMAT(!4,1644)
                                                                                                READ(8) ((XLR(1, J), J=1, NPRBB), I=1, NH8)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XLS(N_*M) = XLS(N_*M) + BCT(K) * XSL(K_*M)
                                                                                                                                                                                                                                                                                   (IL, J) = XSE(IL, J)+XLR(1, J)
(NBRING.EQ.O) GB TB 1150
1225 J=1,NBRING
= 4*(JTNB(J)-1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                            READ(3) (8CT(J), J=1, NJTNH4)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            IF (LINLØD.EQ.0) GØ TØ 3C3
                                                                                                                                                                                                                                                                                                                                             1227 1=1,4
1226 IK=1,NPRBB
             08 991 J=1,NPRØB.
                           PHN1CN41=1 166 00
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   DØ .304 :N=1, LINL 0D
                                                                                                                                                                                                                                             IF(N2.EQ.2) I=NH4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       DØ 806 K=1,NJINH4
                                                                                                                                             I+5HN*(I-IC) = .J]
                                          XSL(I,J) = 0.0
DØ 777 NR=1,NREG
                                                                                                                                                                                                               00 777 J=1,NPR88
                                                                                                                                                                                                                                                                                                                                                                                                                                                                          DØ 717 . M=1.NPRØB
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           301 J=1,NPRØB
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                305 FBRMAT(215,E14.7
                                                                                                                                                                                                                                                        DØ 777 IL=11,111
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 811 J=1,NPRØB
811 I=1,NZ
                                                                        = JRTIC(NR)
= JRSTØP(NR)
                                                                                                               DB 777 N2 =..1,2
                                                                                                                              GBTØ (11,12),N2
                                                                                                                                                                                     II = (.12-1)*4+1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     301 \text{ XFL}(1,1) = 0.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XLS(N,M) = 0.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       2N:1=1 10E 90
                                                                                                                                                                                                                                                                                                                                                                                                                                                DB 876 N=1,NZ
                                                                                                                                                          342 FORMATICALX, 13
304 CONTINUE
303 CONTINUE
READ(5, 2000)
306 CONTINUE
                                                                                                                                                                                                   [ - $HN+11 = [ ]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             WRITE(6,341)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     CONTINUE .
                                                                                                                                                                                                                                                                                                                                                                                                  1227 CONTINUE.
1225 CONTINUE.
1150 CONTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  806 XLS(N,M)
717 CONTINUE
876 CONTINUE
 REWIND: 3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             REWIND 3
                                                                                                                                                                       50T0-3
                                                                                                                                                                                                                                                                                     777 XSL(1
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                                                             503650
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                                                                                          503670
                                                                                                                                                                                                            1770 FØRMAT(//14x,5HJØINT,14x,7HPRØBLEM,13x,7HDELTA T,13x,7HDELTA Z,13X 1
1,7HDELTA R,11x,11HØMEGA-THETA)
                                                                                                                                                              2368 FØRMAT(31X,70HTHE EXPANDED REGIØN JØINT DISPLACEMENT MATRIX (REGIØ
IN END DEFLECTIØNS))
                                                                                                                                                                                                                                                                                                                                                                                                                                       NRITE(6,1765) J.L. (ORE(K,L),K=KK,KKK)
1765 FORMAT(15x,12,18x,12,9x,4(3x,E14.7,3x))
                                                                                                       ORE(J,M)=DRE(J,M)+BCA(N)*XLS(N,M)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      WRITE(3) (DRE(1,J),J=1,NPRBB)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                [F(K.EQ.2) II= JRST@P(NR)#4-3
                                                                                                                                                                                                                                                                                                     IF(NUMBER.LT.56) GØ TØ 1745
                                                                                                                                                                                                                                                                                       NUMBER = NUMBER + NPRØB + 1
811 XLS(I,J)=XFL(I,1)-XLS(I,J)
REWIND 3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                || =(JRTIC(NR) - 1) *4 +1
                                            READ (2) (BCA(K),K=1,NZ)
Og 813 M=1,NPRØB
                               J=1,NJTNH4
                                                                                                                                                                                                                                                                                                                                                                                                                       DØ 1764 L=1,NPR9B
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  DØ 71 NR=1,NREG
                                                                                                                                                                                                                                                                                                                                                 NUMBER-2+NPRØB+3
                                                                                                                                                                                                                                                                          UB 1735 J=1,NBJ
                                                                                          00 813 N=1,NZ
                                                                                                                                                                                                                                                                                                                                                                                              WR.ITE (6, 1739)
                                                                                                                                      WR ITE (6, 1726)
                                                                                                                                                      WRITE(6,2368)
                                                                                                                                                                                                                                                                                                                                   WR TTE (6, 1770)
                                                                                                                                                                                                                                                                                                                     WRITE(6, 1726)
                                                                           DRE( J, M) =0.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               8777 IERROR =8777
                                                                                                                                                                                                                                                                                                                                                                                                             1739 FBRMAT(1H )
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  NERROR=32
                                                                                                                      CONTINUE
                                                                                                                                                                                                                                                                                                                                                                                 KKK=KK+3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1764 CONTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       REWIND 4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                CONTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            REWIND 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          REWIND
                                                                                                                                                                                                                                                                                                                                                                  KK=KK+4
                                DØ 812
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       GØTØ 7
                                                                                                       813
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| SUBRECTINE FLEX | 1,00001
| SUBRECTINE FLEX (A.M.LGC,MID.NIX) | 1,00001
| SUBRECTINE FLEX (A.M.LGC,MID.NIX) | 1,00001
| SUBRECTINE FLEX (A.M.LGC,MID.NIX) | 1,00001
| A.M.TRIX ENDER | 1,00001
| C. C. C. C. C. SINGLE ARRAY DIMENSIANED AT LESS THAN M | 1,00001
| INTEGER LOC(1) | 1,00001
| IN
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SUBROUTINE INITAL

As a result of the matrix operations performed in REGMAT, the SKI22, the XK2221, and the XK22I2 arrays for each region are passed to INITAL. The XK1112 and XL1 arrays for each segment, resulting from the matrix procedures in SEGMAT, are also passed to INITAL. The region end deflection matrices, DRE, which were formed in STRMAT or BCVECT are transmitted to INITAL.

Following appropriate matrix operations upon these arrays, the force initial conditions, the FICS array, and the deflections initial conditions, the DICS array, are produced. These arrays combine to form the YICS matrix, which contains the true initial conditions for the structure to be analyzed.

The pertinent counters in the subroutine are:

NS = segment counter

NR = region counter

| FORTRAN | へくとけ |
|-----------|-------|
| PUD I DAN | LLUID |

ENGINEERING SYMBOLS (REF. 1)

XK2221 MATRIX

 $\begin{bmatrix} \mathsf{K}_{22} \end{bmatrix}^{-1} \quad \begin{bmatrix} \mathsf{K}_{21} \end{bmatrix}$

XK22L2 MATRIX

 $\begin{bmatrix} \mathbf{A} \\ \mathbf{K}_{22} \end{bmatrix}^{-1} \begin{bmatrix} \mathbf{A} \\ \mathbf{L} \end{bmatrix}$

DSE ARRAY

2.15**5**.11.

{ \(\(\) \)

XK1112 MATRIX

 $\begin{bmatrix} k \\ ii \end{bmatrix}$ $\begin{bmatrix} k \\ ij \end{bmatrix}$

ROTD MATRIX

 $\begin{bmatrix} \text{IDT} \end{bmatrix}^{\text{T}}$

DICS ARRAY

{δ(i)}

XL1 ARRAY

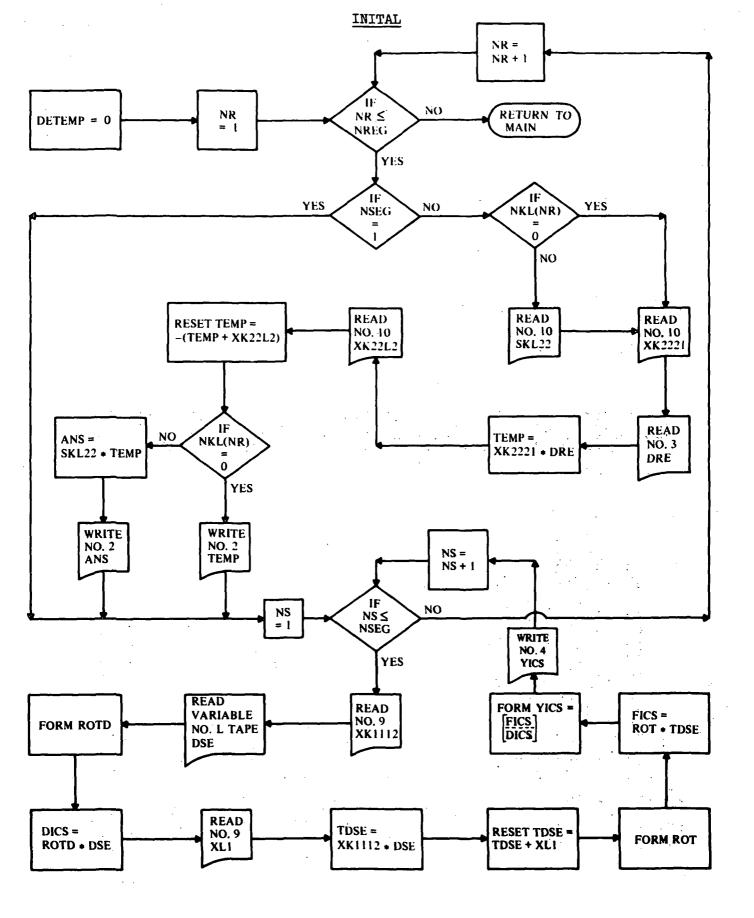
 $\{\ell(i)\}$

ROT MATRIX

[IFT]^T

FICS ARRAY

 $\{f(i)\}$



| FØR. I | S INITAL, INITAL | |
|--------|---|----------|
| | INE INITAL | 1700010 |
| | SAV | 1700020 |
| | NX *INX X | 1700030 |
| | SIBP, KESTBP, KTICK | 040001 |
| | | 1,700050 |
| | XN. TEFREE TIC. PHI STOP BES | 1700070 |
| | NST(30), NKL(30), NXMAT(20), SAVJTC(30) | 1700080 |
| | BMMBN JRSTBP(30),NREG,NMPT,NRC,NSC,NIX,IERRBR,KGEBM,IGEBM | 1700090 |
| | KELVIN, IBEGIN, NPRØB, NSEG, NERRØR, Q, THICK, NØJS, N | 1700100 |
| | MMBN NISKL,NZ,NBCT,LINPUT,NTKKL,NPASS,XNI,KBC,NRINGS | 1700110 |
| | XK2221(112,8),DRE(8,2),TEMP(112,2),XK2 | |
| | HENDINA ANTILLA (4,40), USE (| 1700150 |
| •. | TENSION X 1(4,2), RAT(4,4), FIC(4,2), CK(22(1)2,1)2) | 700150 |
| | CE (RMI(1), RMID(1)), (TIC, TICK) | |
| | (OSE(1), DRE(1)), (XK222 | 1700170 |
| • | IVALENCE (SKL22(1), XK1112(1)), (YICS(1), TDS | 1700180 |
| | | 1700190 |
| | I+5HN=15HN | 1700200 |
| | 1 11 | 1700210 |
| | REWIND 2 | 1700230 |
| | REWING 3 | 1700240 |
| | KENIND 4 | 1700250 |
| | ٥ | 1700260 |
| | • | 1700270 |
| • | | 1702280 |
| - | AMA AMA | 1700290 |
| | DO TOO NAMED A NATION A T | 005001 |
| | KI 22 = 4#(NG.) | 1700310 |
| | 22 = 4*(NBJ- | 1700330 |
| . • | NJTNH4=NBJ*NH4 | 1700340 |
| | M8=4*(NDJ-NKL(NR))-8 | 1700350 |
| | G=NST (NR) | 1700360 |
| | IF (NSEG.EQ.1) G010 703 | 1700370 |
| | . [SKI 22 | 1700390 |
| 425 | EAD (10) (SKL22(1,J),J=1,J | 1700400 |
| | ((XK2221(I,J),J=1,NH8), | 1700410 |
| 202 | READ(10) (SAVJIC(1),SAVSIP(1),I=1,NSEG) | 1700420 |
| 2 | 1 | 1700440 |
| | IF(K.EQ.2) 11=5 | 1700450 |
| | 1 = 11+3 | 1700460 |
| 6 | 00 4 [=11:11] READ(3) (DRE(1:1).J=1.NPRGB) | 1700480 |
| | SEG.EQ.1) GRTØ 999 | 1700490 |
| | 101 | 20 |
| | 1=1, | 1700510 |
| | 0.01.4.J.4.0.4.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0 | 1700530 |
| | Ψ. Ξ. | 1700540 |
| 101 | UE | 1700550 |
| | 510 | S I |
| | KEAD(IU)((XKZZLZ(I•J)•J≡I•NFKBB)•I≡I•MB) Ca Ta 511 | 0/500/1 |
| 510 | 512 | 5.6 |
| | 512 | 5 |

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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               701200
                                                                                                                                            D0 391 N=1,NSEG
IF((N.EQ.1.0R.N.EQ.NSEG).AND.SAVJTC(N).GT.SAVSTP(N)) G0 T0 370
D0 398 K=1,2
IF (N.NE.1.0R.K.NE.1) G0T0 393
D0 394 T= 1,4
WRITE (2) (DRE(1,J),J=1,APR0B)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              U0 201 NS=1,NSEG
READ (9) ((XKII12(1,J),J=1,NH8),I=1,NH4),IGE0M,G1
                                                                                                                   00 445 K = 1,JSKL22
ANS(I,J)=ANS(I,J)+SKL22(I,K)*TEMP(K,J)
                       DØ 102 J=1,NPRØB
DØ 102 I=1,MB
TEMP(I,J)= -(TEMP(I,J)+XK22L2(I,J))
IF(NKL(NR).EQ.O) GØ TØ 435
                                                                                                                                                                                                                                        !F(N.EQ.NSEG.AND.K.EQ.2) G010 395
!F (K.EQ.1) II = SAVJTC(N)#4-7
!F (K.EQ.2) II = SAVSTP(N)#4-7
                                                                                                                                                                                                                                                                                                                                                                                                                                  370 IF (N.E.G.NSEG) GB TB 380
IF (NKL(NR).EG.O) GB TB 375
DB 371 I=1,4
GB 371 I=1,4
GB 372 I=1,4
375 DB 372 I=1,4
375 DB 372 I=1,4
376 DB 373 I=1,4
379 WRITE(2) (TEMP(1,J),J=1,NPRBB)
379 WRITE(2) (DRE(1,J),J=1,NPRBB)
                                                                                                                                                                                                                                                                                                                                            WRITE (2) (TEMP(I,J),J=1,NPRBB) CONTINUE.
                                                                                                                                                                                                                                                                                                                                                                      CB TB 398.
DB 396 I=5.8
WRITE (2). (ORE(I,J),J=1,NPREB)
                                                                                                                                                                                                                                                                                                                    WRITE (2) (ANS(I,J),J=1,NPRBB)
GBTB 397
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            385 DØ 383-4=II,III
383 WRITE(2): (TEMP(I)),J=1,NPRØB)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              00 381 I=5,8
WRITE(2) (DRE(I,J),J=1,NPRØB)
IF(NKL'(NR),EQ.0) GB TØ 385
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 382 WRITE(2) (ANS(I,J), J=1,NPRØB)
                                                                                                                                                                                                                                                                                           08 397 1=11,111
IF (NKL(NR).EQ.0) GBTB 392
                                                                             UB 445 I = 1,15KL22
DB 445 J=1,NPRBB
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 IF.(NR1. EQ.O.) GØTØ8
DØ 7 T=1, NR1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      08 382. I=11,111
                                                                                                      ANS(1, J)=C.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      11 = M8 - 3
                                                                                                                                                                                                                            GØ TØ 398
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          GB TR 391
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                GØ TØ 391
                                                                                                                                                                                                                                                                                                                                                                                                              CØNTINUE
GØ TØ 391
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1SEG=0.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      391 CONTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    REWIND 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             381
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                666
                                                                                                                                                                                                                 394
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396
398
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701300
701310
701320
701340
701350
701370
701370
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  701770
                                                                                                                                                                                                                                                                                                                                                                                                                                                          50 XL1(1.J.) ... 50.0

1F (NH.EG.O) READ(9) ((XL1(I,J),J=1,NPR2B),I=1,NH4)

DØ 202 J=1,NPRØB

DØ 202 I=1,NH4

TDSE(I,J)=0.0

DØ 203 K=1,NH9

DØ 203 J=1,NPRØB

DØ 203 J=1,NPRØB

DØ 203 I=1,NH4

DØ 301 J=1,NH4

DØ 301 J=1,NH4

DØ 301 J=1,NH4

DØ 301 J=1,NH4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        FICS([,,))=R@T((,k)*TDSE(K,))+FICS(I,,))
D@ 402 J=1,NPR@B
D@ 402 I=1,NH4
                                                                                                                                                                                                                                                                                                                                                                                                                       DICS(1, 1) = DICS(1, 1) + RØTD(1, K) * DSE(K, 1)
DØ 356 J=1, NPRØB
                                                                                                                                                                                    DØ 78 I = 1,8

8 READ (2) (DSE(I,J),J=1,NPRØB)

10 CØNTINUE

DØ 302 J=1,NH4

DØ 302 I=1,NH4

DØ 305 J=1,NH4

DØ 305 J=1,NH4,4
                                                                                                                                                                            IF (NSEG.EQ.1) GØ TØ 80
                        TIC= SAVTIC(1SEG)
50 T0 (21,22,23);IGEOM
SN = DSIN(TIC)
                                                                                            = CØS(1.570796-61)
= SIN(1.570796-61)
                                                                                                                                                                                                                                                                                                              RØTD(J+2,J+1)=-CS
                                                                                                                                                                                                                                                                                                                            RØTD(J+1,J+1)=-SN
                                                                                                                                                                                                                                                                                                                                                      RØTD(J+3,J+3)=1.C
DØ 306 J=1,NPRØB
7 ISEG=ISEG+NST(I)
8 ISEG=ISEG+NS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         RØT(J+3,J+3)=1.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          DØ 204 J=1,NH4,4
                                                                                                                                                                                                                                                                                                  RØ10(J+1,J+2)=CS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     RbT(J+1,J+2)=-CS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  RØT(J+2,J+1)= CS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               NS=(1+1.7+1)=8X
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            RØT(J+2,J+2)=SN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               FICS(1, J)=0.0
DØ 205 K=1,NH4
                                                                                                                                                                                                                                                                                                                                                                                              DICS(I, J)=0.0
00 306 K=1,NH4
                                                                                                                                                                                                                                                                                                                                                                                                                                                50 I=1,NH4
                                                                                                                                                                                                                                                                                                                                                                                 DØ 306 [=1,NH4
                                                                                                                                                                                                                                                                                    RØTD(J,J)=1.C
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       RØT(J, J)=-1.0
                                                                                                                                                               CONTINUE ..
                                                                                                                                                                                                                                                                                                                                                                                                                                                  0.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         204
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                                                                                                                                                                                                     48
80
                                                                                                                                                                                                                                                          302
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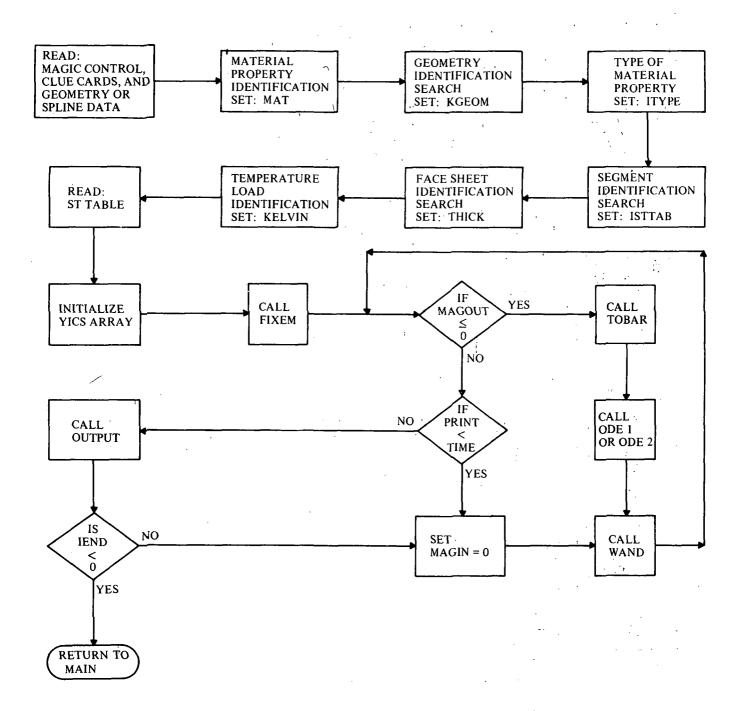
SUBROUTINE LEBEGE

The subroutine link LEBEGE receives the YICS array for each segment from INITAL via Tape #4. The subroutine FIXEM is called to integrate the differential equations of each segment, under true load conditions.

FIXEM is identical to subroutine SETUP, while WAND corresponds to subroutine MAGIC and only consideration of the OVERLAY structure dictates the change in names. The subroutines TOBAR, TEMOEG, PLYCO, and PLYNE are similarly equivalent to ROBOT, GEOMET, PLICO, and PLINE discussed previously.

The results of the final integration sequence are the forces and deflections at the beginning, intermediate, and end points of each segment. In the first pass, first cycle, the prestress and predeformation states are printed from this routine. In other passes the U, V, W eigenvectors are printed, providing convergence has been reached.

LEBEGE



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800150
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       800160
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                                                                                                                                                                                                                                                                                                                               COMMON NST(30),NKL(30),NXMAT(20),SAVJTC(30),SAVSTP(30),JRTIC(30)
COMMON JRSTOP(30),NREG,NMPT,NRC,NSC,NIX,IERROR,KGEOM,IGEOM,ISTTAB
                                                                                                                                                                                                                                                                                                                                                                                               COMMON KELVIN, IBEGIN, NPROB, NSEG, NERROR, G, THICK, NOJS, NLINKS, NLCASE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               2BRIN, 2BRBUT, SCRIPA, SCRIPI, SIFIN, SIFBUT, TZEPH, TZETH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  YANTH, YAMTH, YAMPT, YANPT, YABPH, YAQPH, YAQTH, YAJPH,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XIRI, XIR2, CSIRI, CSIR2, SNIRI, XIRISQ, R2SQ, RØ, BESQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XMTHLD.XMPHLD.ETHET(2),EPHI(2),XGPT(2),ALPHTH(2),ALPHPH(2),
XNUTP,XNUPT,XCII,XC22,XC15,XC33,XD22,XD21,XD12,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XNTIH, XNTPH, XMTTH, XMTPH, XFTHLD, XFPHLD, XFZELD,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               M, I, SITIN, SITBUT, SIPIN, SIPBUT, TPI IN, IPTBUT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XIRB, XIRBSQ, XISNRB, XICSRB, CNIRB, SNIRB, CSIRB,
                                                                                                                                                                                                                                                                                                                                                                                                                              COMMON NISKL,NZ,NBCT,LINPUT,NTRKL,NPASS,XNI,KBC,NRINGS
COMMON (NAMI/ FACE(4),SIRGO(7),THERM(4),MATER(3),SEGTAB(12)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           COMMON /PLS/ OMEGA, IMORD, XMERD, XPRES, XMENT, AZERB, AGNE, ATMO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  S, SN, CS, SNSQ, CSSQ, TAN, SEC, CN, X1CS, X1 SN, TN,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 /SNILPS/ ANG.PSI(100), RAD(100), CURI(100), CUR2(100),
                                                                                                                                                                                          DØUBLE PRECISIØN YNEW,YPRED
CØMMØN STØRYII6),XMATILIC,10),STO(10),SADUS(30),RADUS(30)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                EQUIVALENCE (XMTTH, XMTETH), (XMTPH, XMTEPH), (XNTTH, XNTETH),
                                                                                                                                                                                                                                                                                                COMMON XN, TEFREE, TIC, PHI, STOP, RESTOP, RTICK, G1, XNL(3), NH
                                                                                                                           DØUBLE PRECISION SAVTIC, TIC, PHI, STØP, RESTØP, RTICK DØUBLE PRECISION DTAU, DIFF, STEP, DELTA, TIME, DTIME
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       DIMENSIAN LST(13), YCEV(16), YICS(16), YNEW(16)
DIMENSIAN XKF(128), TBCEL(16), FWDEL(16), YCORR(16)
DIMENSIAN ST(72,31), XLAYER(10)
DIMENSIAN XSAVY(3,2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               , XNPHI, BETTA, ZETTA, SAVY (8), XC16
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            COMMON /LASTEQ/ YPRED(16), YDØT(16), YASAVE(16),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XK11, XK12, XK21, XK22, XK33, XD11,
                                                               INTEGER SAVJIC, SAVSTP, SEGTAB, Q , THICK, TYPE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 FØRMAT(1H ,8(E14.7.2X)/(3X,8(E14.7,2X)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 RØSG, XNSQ, BETA, RI, RZ, SI, RIDØI, RISQ,
                                                                                                                                                                                                                                                                TADUS (30), UABUS (30), SAVTIC (900)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             DRIDP(100), ZI(14), RI(14), NRZIN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 EQUIVALENCE (XSAVY(1,1), SAVY(1))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      IF(JNSC.LE.NST(JAM)) GB TB 1727
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  (YNEW(1), XKF(1))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      (XNTPH, XNTEPH)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  (NRNG.EQ.0) GØ TØ 1900
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 DIMENSION TMPAY (5) "KWB(8)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  EQUIVALENCE (XNPHI, XNPI)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 /ARING/ NRING(28)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   /MAGIO/ KKNT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               KSC = KSC + NST(I)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  NRNG = NRING(JAM)
FOR, IS LEBEGE, LEBEGE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               DØ 451 I=1,NREG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  FOUTVALENCE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      JNSC=JNSC+1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   = HdIMX
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                KSC = C
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                JNSC =0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 *NTTH =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XMTTH =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    * Hdlnx
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   NSC=LSC
                                                                                                                                                                                                                                                             COMMON
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              COMMON
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             COMMON
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                COMMON
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 REWIND
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   JAM =1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  451
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E ARE , 12, 14H SEGMENT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           BR.KGEBM.EQ.2.BR.KGEBM.EQ.5.BR.KGEBM.EQ.6) IGEBM =1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    WRITE(6,651) JNSC,1 ,(STØRY(I),I=1,16)
FØRMAT(//13X,15HSEGMENI NUMBER ,12,5X,13HSEGMENI CØDE ,12,5X,
                                                                                                                                                                                                                                                                                                         READ(1) TYPE, HLAYR, SHEET, INTERP, RANKIN, TEFREE, NP
                                                                                                                                                                                                                                                    CØ TØ 183
P.EAD(L) NRZIN, (ZI(J), RI(J), J=1, NRZIN)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     MATERIAL PROPERTY IDENTIFICATION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    IF (INTERP-SEGTAB(I))510,511,510
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               GEBMETRY IDENTIFICATION SEARCH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       IF (HLAYR-STD(I)) 501,502,501
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    IF(RGB-STRGB(1)) 504,505,504
                                                                                                                                                                                  READ(1) RGB, ANG, STOR
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     IS AND , 12,35H KINEM
                                                                                                                                                                                               READ(1) DTAU, DIFF
IF (RGB.EQ.14.0) (
                                   NNSKL = NKL(JAM)
READ(1) DUMLNK
                                                                                                                                                                                                                                                                                                                                                                                                                1726 FORMATITHE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     GOTO 8087
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                  CONTINUE
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                                                                                                                                                                                                                                      READ(1)
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 1061
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                                                                                             801370
                                                                                                                                                                   GB TB (430,430,420,420,420,420,425,425,425, 430,430,430),ISTTAB
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               IF (NLC.GT.1.AND.LST(1).NE.C.AND.LST(JT).NE.0) GØ TØ 8008
                                                          TEMPERATURE LOAD IDENTIFICATION DØ 401 I=1.4 IF(RANKIN.EQ.THERM(I))G010 402
IF (SHEET-FACE(1)) 508,509,508
                                                                                                                                                                                                                                                             LINEAR ANALYSIS IDENTIFICATION
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    READ(1) (LST(J),J=JJ,JJJ)
[F(LST(JJ))8031,19,20
                                                                                                                                                                                                                                                                                                                                                                                                                                                          (ISTTAB.EQ.11) NRØW
(ISTTAB.EQ.12) NRØW
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               19 JJ=JJ+1
23 IF(LST(JJ))8031,22,21
21 L=L+1
22 IF(JJ.EQ.JJJ) G0I@ 24
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1F(JJ.EQ.JJJ) G0TB 24
                                                                                                                                                                                                                                                                                                                                                                                                                                             ISTTAB.EG.10) NRE
                                                                                                                                                                                                                                                                                                        (THICK.GT.1) NRBW
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         IF(L.EQ.0) GØ TØ 71
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          I = I, NROW
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      DØ 750 JJ=1,12
LST(JJ) = 0
                                                                                                                                                                                                                                                                       IANLYZ = 1
                                                                                                                                                                                                                             430 KLUEI=THICK
                                                                                                          401 CONTINUE
                                                                                                                                     KELVIN=I
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      READ(1)
                                                                                                                                                                                                              425 KLUE2=3
                                                                                                                                                     KLUE2≈1
                                                                                                                                                                                   420 KLUE2=2
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IF (NH.ME.O.AND.NLCASE.NE.O) READ(13) SAVY
59 CALL FIXEM (MAGIN.MAGDUT,TIC,STEP,NEONS,DTAU,EPSIL,DELTA,ERR,TIME, 1802300
1 DTIME,YICS,YPRED,YCØRR,YDØT,YNEW,YDEV,FWDEL,TBDEL)
1802310
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1F(NH.EQ.0)WRITE(6,1333) TIME,((XSAVY(J1,K1),J1=1,3),K1=K2,NLCASE)
1333 FORMAT(1X,1PE16.7,2(5X,1P3E16.7))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     60 CALL WANDIMACIN, MAGBUT, TIC, STEP, NEQNS, DTAU, EPSIL, DELTA, ERR, TIME,

1 DTIME, YICS, YPRED, YCRRR, YDBT, YNEW, YDEV, FWDEL, TBDEL)

61 IF (MAGBUT, LE, 0) GBTE 25

1F (NH, EQ, 0, AND, NLCASE, NE, 0) WRITE(13) SAVY

1F(INE, CT, STBP) GBTB 63

1F(TIME, LT, STBP) GBTB 63
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1 //3x,-PHI @R S-,10x,-U-,14x,-V-,14x,-W-,9x,-EMEGA THETA-,8x,
2 -U-,14x,-V-,14x,-W-,9x,-BMEGA THETA-/)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       656 FORMAT(//5x,-PHI OR S-,13x,-NTHETA-,11x,-NPHI-,11X,-OMEGATH-)
1F (NH.EQ.O.AND.NLCASE.EG.2) WRITE(6,657)
657 FORMAT(1H+,8Cx,-NTHETA-,11X,-NPHI-,11X,-BMEGATH-)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1-,37x,-V E C
                                                                                                                                                                                                                                              KEAD(1) IS,SAVJTC(IS),SAVSTP(IS),STERY
NSAVE = NRØW
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 IF((ST&P-DIFF).LE.TIME) G010 64
IF((TIME+DTIME).GT.ST&P) G010 65
IF(PRINT.GT.TIME) G010 66
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            62 IF(TIME.LE.(STØP+DIFF)) GØTØ 64
                       (ST(M, J), J=1, NP)
                                                                                                                                                                                                                                                                                                                                                                                                                                                            (YICS(I), I=1, NEGNS)
                                                                IF (LST(JI).EG.0) G# T# 660
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1F (NH.NE.O) WRITE(6,671)
671 FØRMAT(//27x,-V E C T
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              IF (NH.EQ.0) WRITE(6,661)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       IF (NH.EQ.0) WRITE(6,656)
                                                                                                                                                K = K + L^{\perp} - LST(JT)
                                                                                    KZ = K + LST(1) - 1
                                                                                                                                                                                                                                                                                                                                                                              NTOTAL=LT+NSAVE
                                                                                                                                                                                                                                                                                                                                                                                                                                      STØP = ST(1,NP)
READ(4) (YIC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               PRINT=TIME+DTA
                                                                                                                                                                                                                                                                                                                                     UB 15 J=1,JJ
LT=LT+LST(J)
                                                                                                                                                                                                                                                                                           JJ = NLCASE*6
                                                                                                                                                                                                                                                                                                                                                                                               NEONS=8*NPRBB
DØ 72' M=K,KK
                                                                                                                                                                                                                                                                                                                                                                                                                 TIC = ST(1,1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 NSAVE=NR@W
                                                                                                       = K2 + 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        PRINT=TIC
                                             CONTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               GØTØ 8001
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                                                                                                                             CONTINUE
                                                                                                                                                                                                           17 MM=MM+1
590 CØNTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                NCYC=0
                                                                                                                                                                    1+555=55
                                                                                                                                                                                          3+10=111
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                       READ(1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        GBTB 67
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       IEND=0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    64 IEND=-1
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                                                                                                                                                                                                                                                                                                  U0 57 IK=2,NTØTAL
ST(IK,LL)=ST(IK,1-1)+(ST(IK,1)-ST(IK,1-1))*(ARG-ST(1,1-1))/(ST(1,1
                                                                                                                                                                                                                                                                                                                                                                                             THE UPDATED INTERPOLATED VALUES OF THE MATERIAL PROPERTY COEFFIC
IENTS ARE FOUND IN THE XMAT TABLE AND STORED IN THE XLAYER ARRAY
L=(MAT-1)*2+1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        IMPAV(ILBW)=(ST(L,LL)+ ST(L+1,LL)+ ST(L+2,LL) + ST(L+3,LL))/4.0
                                                                                                                                                                               IF (NH.NE.O.AND.KKNT.EQ.4.AND.NLCASE.NE.O) READ(13) SAVY
LL=NP+1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         TMPAV(IL@W)= (ST(L,LL)+ ST(L+1,LL))/2.0
TMPAV(IHIGH)=(ST(L+2,LL) + ST(L+3,LL))/2.0
IF (NH.NE.O) WRITE(6,1334) TIME,RWB
1334 FBRMAT(1x,1PE13.7,2(1x,1P3E15.7,1PE13.5))
6450 IF(1END.GT.O) GB TB 8002
IF(1END.LT.O) GBTB 150
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           IF (ARG-XMAT(II, I)) 121,123,104
IF (I-2) 8007,8007,124
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                IHIGH = 1
IF(KELVIN .NE. 1)GØ TØ 85
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               GWTØ (91,92,93,93),KELVIN
91 ARG= TMPAV(IL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          IF (KELVIN .NE. 1)GØ TØ 81
IF (THICK.NE.1)GØ TØ 83
                                                                                                                                                                                                                               F(ARG-ST(1,1)) 52,55,51
52 IF(1-1) 55,55,54
51 CØNTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   DØ 105 IL=ILØW, IHIGH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ARG = STINRON+1, LL)
                                                                                                                                                                                                                                                                                                                                                                     ST(IK, LL)=ST(IK, I)
                                                                                                                                                                                                                                                                                                                                                      55 DØ 58 IK=2,NTØTAL
58 ST(IK,LL)=ST(IK,I
80 CØNTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            94 UØ 104 I = 2,10
                                                                               DT IME=STØP-TIME
DELTA=0.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                   I I I = NXMAT (L+1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  TMPAV(1) = ARG
                                                                                                                                                                                                                                                                                                                              1)-ST(1, I-1))
                                                                                                                                                                                                                    00 51 I=1,NP
                                                                                                                        NCYC=NCYC+1
                                                                                                                                                                                                                                                                                                                                                                                                                                       II=NXMAT(L
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                L=NROW + 1
                                                                    GØTØ 60
                                                                                                                                                               PHI=TIME
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           82 CONTINUE
                                                                                                                                                                                                                                                                                        GB TB 55
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     GØ TØ 85
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       93 CONTINUE
                                                                                                                                       MAGIN=-1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    L00P = 2
                                                                                                                                                    COTO 60
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          SØTØ 94
                                                      66 MAGIN≖0
                                                                                                           GBTB 67
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   LL=NP+1
                                                                                                                                                                              ARG=PHI
                                                                                                                                                                                                                                                                                                                                            GØTØ 80
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                                                                                                                                                                                                                                                                                                                                                803370
                                                                                                 D0 125 J=L,III
XLAYER(M)=XMAT(J,I-1)+(XMAT(J,I)-XMAT(J,I-1))*(ARG-XMAT(II,I-1))/
(XMAT(II,I)-XMAT(II,I-1))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ALPHPH(IL)= ALPHTH(IL)
XGPT(IL)= ETHET(IL)/(2.0*(1.0+ XNUPT))
GØ TØ 105
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ALPHS = XLAYER(10)
XNUPT = ETHET(IL) * XNUTP/EPHI(IL)
                                                                                                                                                                                                                                                                                                   XGPT(1) = ETHET(1)/(2*(1+ XNUPT)
XGPT(2) = ETHET(2)/(2*(1+ XNUPT)
                                                                                                                                                                                                                                          GØ TØ (115,115,112,113,114),LØØP
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XGPT(IL) = XLAYER(6)
XNUPT= ETHET(IL)* XNUTP/EPHI(IL)
                                                                                                                                                                                                                                                                                                                                                XNUTP = XLAYER(3)
XNUPT = ETHET(1)*XNUTP/EPHI(1)
                                                                                                                                                                                                                                                        XNUTP= XLAYER(2)
IF(ITYPE.NE. 1)G0 T0 131
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    GØ TØ(101,102,103),1TYPE
ETHET(1L)= XLAYER(1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XNUTP =XLAYER(2)
ALPHTH(IL)= XLAYER(3)
EPHI(IL) = ETHET(IL)
XNUPT= XNUTP
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      ALPHTH(IL) = XLAYER(4)
ALPHPH(IL) = XLAYER(5)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ALPHTH(IL)= XLAYER(4)
ALPHPH(IL)= XLAYER(5)
                                                                                                                                                                                                             XLAYER(M)= XMAT(J,1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ETHET(IL)= XLAVER(1)
EPHI(IL) = XLAYER(2)
XNUTP = XLAYER(3)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ETHET(1L) = XLAYER(1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XGPT(IL) = XLAYER(6)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          EPHI(IL)= XLAYER(2)
                                            XLAYER(M)=XMAT(J, I)
                                                                                                                                                                                                                                                                                                                                                                                                         ALPHS=XLAYER(10)
                                                                                                                                                                                                                                                                                                                                                                                                                                      ALPHR = XLAYER(9)
ER = XLAYER(7)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ALPHR = XLAYER(9)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XNUTP= XLAYER(3)
                            00 122 J=L, III
                                                                                                                                                                                                                                                                                                                                                                                           ES= XLAYER(8)
                                                                                                                                                                                                                                                                                      XNUPT= XNUTP
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ES =XLAYER(8)
                                                                                                                                                                                  = 11 + 1
GØTØ 8067
                                                                          GØTØ 111
                                                                                                                                                                   GØTØ 111
                                                                                                                                                                                                DØ 922
                                                                                         154 L=[[+]
              [=[[+]
                                                          122 M=M+1
                                                                                                                                                   125 M=M+1
              123
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1804280
803740
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               CALL T0BAR (ST.KLUE2,NR0N,LL,ER,ES,E1,E2,H1,H0,T,TII,T00,TIK,T0K, DEGRES,G2,G3,TIME,NC0NT)
IF (NIX.NE.O) G0 T0 9999
                                                                                                                                 .AND. ISTTAB .GE. 3)GØ TØ 109
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             IF(ITYPE.EQ.3.AND.XK12.EG.O.) GØ TØ 8102
IF(ITYPE.EQ.3.AND.XK21.EG.O.) GØ TØ 8103
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           F(ITYPE.EQ.3.AND.XD12.EG.O.) GØ TØ 8107
F(ITYPE.EQ.3.AND.XD21.EG.O.) GØ TØ 8108
                                   GØ TØ (117,107,108,281,118), LØBP
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  IF(XD22.EQ.0.0) GBTB 8109
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     IF(XD33.EQ.0.0) GBTB 8110
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    GØ TØ 85
TMPAV(5)= ST(L+3,LL)
GØ TØ 85
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ALPHTH(2)=ALPHTH(1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ALPHPH(2)=ALPHPH(1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              TMPAV(5)= ST(L, LL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    IF (NH.EQ.O') NLCSE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XGPT(2) = XGPT(1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            EPHI(2) = EPHI(1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          JF = NPREB
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            118 CONTINUE
                                                                                                                                 108 IF(ITYPE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             CONTINUE
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                                                   101
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1804620
1804290
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                                                                                 100 250 JKL=1,NLCSE
IF (JKL.EQ.2.0R.(M.EQ.2.AND.NH.EQ.0).0R.IW0RD.EG.3.0R.IM0RD.EG.5)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          SAVY(NN+2) = YPRED(I+7)
GØ TØ (177,178,179),IGEØM
SAVY(M+6) = XIR®*(XN*YPRED(I+4)+YPRED(I+5)*CS-YPRED(I+6)*SN)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            178 SAVY(M+6) = (1.0/(S*CS))*(XN*YPRED(1+4)+CS*YPRED(1+5)-SN*
1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          IF (ISTTAB.GE.3.AND.ISTTAB.LE.9) G0 T0 4002
Call Odei (XfPHL1,XFZEL1,XFPHL2,XFZEL2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          CALL ØDE2 (XFPHL1, XFZEL1, XFPHL2, XFZEL2)
IF (NH.NE.0) GØ TØ 8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          IF (IMBRD.EQ.3.BR.IMBRD.EQ.5) NN = 4
                                                                                                                                                                                                                                                 IF (LST(IR+1).NE.0) K=K+LST(IR)
IF (LST(IR+1).EQ.0) GBIØ 44
                                                                                                                                                                                                                                                                                                                                                                                                                                                      XMTHLD=ST(K, LL)
IF(LST(IR+5).EQ.0) GBTØ 48
                                                                                                                                                                                                                                                                                                                                                 XFPHLD=ST(K,LL)
IF(LST(IR+3).EQ.0) GBTØ 46
                                                                                                                                                                                                                                                                                                    XFTHLD=ST(K, LL)
IF(LST(IR+2).EQ.0) G010
                                                                                                                                                                                                                                                                                                                                                                                                    XFZELD=ST(K,LL)
IF(LST(IR+4),EQ.0) G0T0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          (JKL.EQ.2) GB TB 251
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             SAVY(NN+1) = YPRED(I+1)
            IF (NH.EG.0) GB TB 350
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             SAVY(NN) = YANTH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          = XFPHLD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          KFZEL2 = XFZELD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XMPHLD=ST(K, LL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             NN = (M-1) +3+1
                                                                                                                                                   XFTHLD=0.0
                                                                                                                                                                   (FPHLD=0.C
                                                                                                                                                                                   (FZELD=0.
                               K = NRDW
                                                              CONTINUE
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                                                                                                                               NL=NL+1
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IF (M.EQ.2) N = 5
RWB(N) = YPRED(1+4)
RWB(N+1) = YPRED(1+5)
RWB(N+2) = YPRED(1+6)
RWB(N+3) = YPRED(1+7)
                                                                                                                                                                                                              G010 8888
1ERROR = 8008
NERROR = 10
G0 T0 8888
IERROR = 9
NERROR = 9
                                                                                                                                                                                                                                                                                                                                                                                G010 8888

8087 IERRØR=8087

G010 8888

8088 IERRØR=8088

NERRØR=27

G010 8888

8090 IERRØR=8090

NERRØR=6090

NERRØR=16

G010 8888

8101 IERRØR=8101
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    G010 8888
IERRØR = 8103
NERRØR = 19
                                                                                                                              GØTØ 8888
Ierrør=8002
Nerrør = 12
                                                                                                                                                                       GØTØ 8888
IERRØR=8007
NERRØR = 15
                                                                                                                                                                                                                                                                                                   GØTØ 8888
Ierrøk=8036
Nerrør = 2
                                                                                                                                                                                                                                                                                                                                            GØTØ 8888
IERRØR=8086
NERRØR = 3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               GØTØ 8888
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                                                          FORTRAN IV
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  = YNEW(1) + DTIME + (FWDEL(1) + 2. +TBDEL(1) + YDBT(1))/6.
                                                      RUNGE KUTTA MAGIC (REVISED) SINGLE PRECISION FORTRA
DIMENSION VICS( 1), VPRED( 1), VCORR( 1), YOUT( 1), VNEW( 1),
VDEV(1), FWDEL(1), TBDEL(1)
                                                                                                                                                                                                                                                                                                                                                                                                EPSIL, DELTA, ERR, TIME, DTIME, VICS, YPRED,
                            EPSIL, DELTA, ERR, TIME, DTIME, VICS, YPRED, YCØRR, YDØT, YNEW, YDEV, FWDEL, TBDEL)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        (EPSIL*ABS(YCØRR(I)) + ERR - ABS(YDEV(I))) 14,13,13
            SUBRBUTINE FIXEM (MAGIN, MAGBUT, TIC, STEP, NEGNS, DTAU,
                                                                                                                                                                                                                                                                                                                                                                                                               YCBRR, YDBI, YNEW, YDEV, FWDEL, TBDEL)
                                                                                                                               DØUBLE PRECISIØN YNEW,YPRED
DØUBLE PRECISIØN TIC,STEP,DTAU,DELTA,TIME,DTIME
                                                                                                                                                                                                                                                                                                                                                                                   ENTRY WAND (MAGIN, MAGBUT, TIC, STEP, NEONS, DTAU
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 7 TBDEL(1) = TBDEL(1) + YDØT(1)
105 YPRED(1) = YNEW(1) + C(K)*DTIME*YDØT(1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  - YPRED(1)
                                                                                                                                                           DATA C.D / .5.5.1.0..5..0..5/
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          = TIME + D(K) + DTIME
                                                                                                                                                                                                                                                                                                                                                                                                                                           IF (MAGBUT) 305, 101, 101
                                                                                                                                                                                                       IF (DELTA)200,201,200
                                                                                                                                                                                                                                                                                                                                                                                                                                                         IF (MAGIN) 21, 27, 14
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           GØ TØ (9,6,7,4,11),K
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  = YCORR(I)
                                                                                                  DIMENSION C(3), D(3)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   = YPRED(I)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              400 YCBRR(I) = YPRED(I)
                                                                                                                  COMMON /MAGIO/ KKNI
                                                                                                                                                                                                                                                                = 1,NEQNS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     DØ 202 I = 1,NEQNS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               = 1.NEGNS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        6 TBDEL(1) = YDØT(1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      I = 1,NEONS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               (DELTA)80, 5,80
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      IF (SIGB)15,15,205
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           FWDEL(1) = YDBT(1)
                                                                                                                                                                                                                     DTIME = 0.0078125
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  GB TB (2,2,400),K
FOR, IS FIXEM, FIXEM
                                                                                                                                                                                                                                                  DTIME = STEP
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     205 S168 = 0.0
                                                                                                                                                                            TIME = TIC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      GØ TØ 105
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          GB TB 105
                                                                                                                                                                                                                                    GØ TØ 225
                                                                                                                                                                                                                                                                                                                                                       GB TB 264
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                                                                                                                                                                                                                                                                                                            YCERR(I)
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                                                                                                                                                    COMMON STORY(16), XMAT(110, IC), STD(10), SADUS(30), RADUS(30)
COMMON TADUS(30), UADUS(30), SAVIIC(900)
COMMON NA, TEREE, TIC, PHI, STOP, RESTOP, RTICK, GI, XNL(3), NH
COMMON NST(30), NNK, GO, NNKAT(20), SAVIIC(30), SAVSTP(30), JRTIC(30)
COMMON NST(30), NNEG, NPT, NRC, NSC, NIX, IERROR, KGEOM, IGEOM, ISTAB
COMMON MELVIN, IBEGIN, NPROB, NSEG, NERROR, G, THICK, NOJS, NL INKS, NLCASE
COMMON NTSKL, NZ, NBCT, LINPUT, NTRKL, NPASS, XNI, KBC, NRINGS
                                                                                                                                                                                                                                                                                                                                     S,SN,CS,SNSQ,CSSQ,TAN,SEC,CN,XICS,XISN,TN,
XIRE,XIRBSQ,XISNRB,XICSRB,CNIRB,SNIRB,CSIRB,
XIRI,XIRZ,CSIRI,CSIRZ,SNIRI,XIRISQ,RZSQ,RB,BESQ,
RBSQ,XNSQ,BETA,RI,RZ,SI,RIDGT,RISQ,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ZBRIN, ZBRØUT, SCRIPA, SCRIPI, SIF IN, SIFØUT, TZEPH, TZETH
                                                                                                                                                                                                                                                                                                                  YANTH, YAMTH, YAMPT, YANPT, YABPH, YAQPH, YAQTH, YAJPH,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  IF(KGE0M.EQ.1.AND.BETA.NE.1.0.AND.SN.NE.0.0)RIDBT=3.0*(R2*BETA/
1A) **2*(CS/SNSQ)*(R1*SN-R0)
IF(SN.EQ. 0.0)G0 IB 779
                                                                                                                                                                                                                                                                                                                                                                                                                                      XMTHLD,XMPHLD,ETHET(2),EPHI(2),XGPT(2),ALPHTH(2),ALPHPH(2), XNUTP,XNUPT,XC11,XC22,XC15,XC33,XC22,XC21,XD12,
                   SUBRBUTINE 10BAR (ST,KLUE2,NRBW,LL,ER,ES,E1,E2,H1,H8,T,TIL,100,
TIK,10K,DEGRES,G2,G3,TIME,NC0NT)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   M. I, SITIN, SITBUT, SIPIN, SIPBUT, TPT IN, TPTBUT,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             DRIDP(100),ZI(14),RI(14),NRZIN
CØMMØN /PLS/ ØMEGA,IWØRD,XMERC,XPRES,XMØNT,AZERB,AØNE,ATWØ
DIMENSIØN ST(72,31)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      COMMON /SNILPS/ ANG.PSI(100), RAD(100), CURI(100), CUR2(100),
                                                                                                                    DBUBLE PRECISION SAVIIC, TIC, PHI, STOP, RESTOP, RTICK
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ,XNPHI,BETTA,ZETTA,SAVY(8),XC16
                                                                                                                                                                                                                                                                                           COMMON /LASTEQ/ YPRED(16), YDØT(16), YASAVE(16),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XK11, XK12, XK21, XK22, XK33, XD11,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           GBTB (771,772,773,774,775,776,7077),KGERM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              GEBMETRY FOR ELIPSE (G3=BFFSET DISTANCE )
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              R2 = A*SQRT(1.0/(SNSQ+BESQ*CSSQ))
                                                         INTEGER SAVJTC, SAVSTP, Q, THICK INTEGER XN1, XN2, XN
                                                                                                                                       DAUBLE PRECISION YPRED, TIME
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          .EG. 0.0)GB.TB 7775
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R25Q = R2**2
FOR, IS TOBAR, TOBAR
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CSSQ = CS##2
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RIDGT =- XN3 * A * (SN * * XNE XP * CS / 4.C) * (2.0 / (1.0 + SN * * XN1)) * * XN5
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XN5=XN4/XN1
SN = 0SIN(PHI)
CS = DC0S(PHI)
R2= A*(2.0/(1.0+SN**XN1))**XN2
R1=(A/2.0)*(R2/A)**XN3
GEBMETRY FOR OGIVE
R1=61
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       GENERAL GEMMETRY
SN = DSIN(PHI)
CS = DCØS(PHI)
                                                                                                                                                                                                                                                                                                                                                                                                                                              XN1=1.0+XNEXP
                                                                                                                                                                                                                                                     RZ=CS#SN#PH
RØ=PHI*CS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XN3=XN1+1.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XN4=XN3+1.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                            XN2=1.0/XN
                                                                                                                                                                                                           SN=SIN(G1)
S=PHI
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223 RØ = RAD(J
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              RØ=R2*SN
                                                                                                                                                                                                                                                                                                                                                                        RIDBI=0.0
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                                                                                                                                                                                                                                        S1=1.0/S
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                                                                                                                                                                                                                                                                                                                                                                                                                                                  2601
                                                                                  RØ = RAD(J-I)+(RAD(J)-RAD(J-I))*SUB1/SUB2
RI = CUR1(J-I)+(CURI(J)-CURI(J-I))*SUB1/SUB2
R2 = CUR2(J-I)+(CUR2(J)-CUR2(J-I))*SUB1/SUB2
R100I = DR1DP(J-I)+(DR1DP(J)-CR1DP(J-I))*SUB1/SUB2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             COMPUTATION OF K AND O FOR MATERIAL PROPETY INPUT
                                                                                                                                                                                                                                                                                  IF(IGEØM.EQ.1) DEGRES = PHI * 57.29578
RØSG = RØ**2
                                                                                                                                                                                                                                                                                                                                                                                                                      CSIRB=CS/RB
SNSQ=SN**2
CSSQ=CS**2
IF (KGECS**6Q**EQ**9R*KGEBM*EQ*3) GBTB 79
RISQ = R1**2
RZSQ = R2**2
                                                                                                                                                                                                                                               RIDØT = - ((A**2)*0.5)*(RI*CS)/RØ**2
                                                          SUB1 = ARG-PSI(J-I)
SUB2 = PSI(J)-PSI(J-I)
                                                                                                                                                ISØTENSØID GEØMETRY
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XISN=1.0/SN
XISNRØ=1.0/(SN*RØ)
XIR1=1.0/RI
XIR2=1.0/R2
                                                                                                                                                                                                                                                                                                                                  X1CS=1.0/CS
IN=SN/CS
X1RB=1.0/RB
X1RBSQ=1.0/RB**2
X1CSRB=1.0/(CS*RB)
                                                                                                                                                                                                           R2 = A / SQRT(SN)
R1 = 0.5 * R2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     X1R1SQ=1.0/R1##2
                                                                                                                                                                        SN = DSIN(PHI)
CS = DCØS(PHI)
                                                                                                                                                                                                                                                                         0.0
                                                                                                                                                                                                                                  RB = R2 + SN
           GØ TØ 8888
8503 NERRØR = 42
                                                                                                                                                                                                                                                                                                           XNSQ=XN**2
CN=CS*SN
                                                                                                                                                                                                                                                                                                                                                                                                 CN1RØ=CN/RØ
                                                                                                                                                                                                                                                                                                                                                                                                           SNIRB=SN/RB
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             CS1R2=CS/R2
SN1R1=SN/R1
                                                GØ TØ 8889
8502 NERROR = 4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 CS1R1=CS/R
                                                                                                                                                                                                                                                            TAN=SN/CS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XNTPH=0.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XMTTH=0.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XMTPH=0.0
                                                                                                                                    GBIB 7775
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                                                                                                                                                            CONTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      HØ = 0.0
                                                                                                                                                                                                                                                                         DEGRES
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  T = 0.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             HI = 0.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         RHØR =
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                                    = XIN
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                                   8888
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C CTH = 0.0

VBARC = 0.0

VBARC
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2602630
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                                                                                                                                                                                  RANKIN-THSTND MEANS INTERPOLATE, COMPUTE NTEMP, MTEMP
RANKIN-NOTHRM MEANS DØ NOT INTERPOLATE, DØ NOT COMPUTE NTEMP, NTEMP
RANKIN-ETHCNST MEANS DØ NOT AVERAGE, BUT INTERPOLATE, COMPUTE
                                                                                                                                                                                                                                     NTEMP, MTEMP RANKIN=THINHS MEANS INTERPOLATE, BUT OB NOT COMPUTE NTEMP, MTEMP
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                GB.TB (103,42,103,42,47,49,42,47,49,42,47,49),1STTAB
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          TEMP3= (1.0-XNUPT * XNUTP)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           E1= (ETHET(1)+ EPHI(1))/2.
E2= (ETHET(2)+ EPHI(2))/2.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             TØ (42,47,49,41), THICK
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    TEMP2/(12.0* TEMP3)
EPHI(1)* HI
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  TEMP1= ETHET(1) * HI
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      FEMP2= TEMP1*HI**2
                                                                                                                                AA = RHOS*XITH
                                                                                                                                                                                                                                                                                                          XK11=ST(2,LL
                                                                                                                                                                                                                                                                                                                            XK12=5T(3,LL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 SINGLE SHEET
                                                                                XITH = XIPH
                                                                                                                   KHBR = RHBS
                                                                                                                                                                      ST10, RWAF
                                                                                                  STH = SPH
                                                                                                                                                    GØ TØ 40
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                                                                                                                                                                                                                                                                                                                                                                                                                                XDI]=(XKI]* HI**2)/I2.+ HI*( ETHET(]) * 28HIN + ETHET(2)*28HBUT)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ZBRIN =((ElaHla+2)+(E2*HB**2) +(2.0+E2*HB*HI) +(2.0*E2*HB*T)) /
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ZBRBUT=((E1#H1##Z)+(E2#H8##Z) +(2.0#E1#H8#HI) +(2.0#E1#H1#T)) /
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XD22=(XK22* HI**2)/12.+ HI*( EPHI(1) * ZBHIN + EPHI(2)* ZBHBUT)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              ATHR = (RHBC*T**3+RHBI*2.0*HI**3)/12.0+RHBI*HI*(ZBHIN+ZBHBUT)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 022 = (EPHI(1)* HI**3 + EPHI(2)*HØ**3)/12.
XD22=:( 022 +(HI*EPHI(1)*ZBHIN) + (HØ*EPHI(2)* ZBHØUT)) /PERM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               + (HØ*ETHET(2) *28HØUT))/PERM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            DETERMINE COMPLETE CONSTANTS DEPENDENT ON REINFORCEMENT CLUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            X033 = (XGPI(1)*HI**3+XGPI(2)*HØ**3)/12.+HI*(XGPI(1)*ZBHIN)+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               ATHR = (RHBC*T**3+RHBI*(HI**3+HB**3))/12.0+RHBI*(HI*ZBHIN+
                                                                                                                                                                                                                                                                                                                                                                                         XD33= (HI**3*(XGPT(1)+XGPT(2)))/12.0+ HI*(XGPT(1)* ZBHIN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              011.= (ETHET(1)*HI**3 + ETHET(2)*HØ**3)/12.
XD11=(D11+ (HI*ETHET(1)*28HIN) + (HØ*ETHET
                                                                                                                                                                                                                                                                                                                                        BRBUT = (HI*(E2+3.0*E1)+2.0*E1*T)/(2.0*ES1)
                                                                                                                                                                                                                                                                                                                      !BRIN = (HI*(E1+3.0*E2)+2.0*E2#T)/(2.0*ESI
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XK11= (ETHET(1)* HI + ETHET(2)* HØ)/PERM
XK22= (EPHI(1) * HI + EPHI(2) * HØ)/PERM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XX33= XGPT(1)+HI + XGPT(2) + HØ
                                                                                                                                                                                                                                                                                                    KK33= HI*(XGPT(1)+ XGPT(2))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     IBHBUT = (ZBRBUT-HB/2.0) **2
                 KD22= TEMP2/(12.0* TEMP3)
                                                                                                                                                                                                                                                                                                                                                         ZBHIN= (ZBRIN- HI/2.0)**2
                                                                                                                                                                                                                                               ETHET(1)+ ETHET(2)
                                                                                                                                                                                                                                                                                                                                                                           ZBH@UT=(ZBR@UT-H1/2.0)**2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ZBHIN = (ZBRIN-HI/2.0)**2
                                                                                                                                                                                                                                                                                                                                                                                                               XGPT(2) * ZBHBUT)
                                                                                                                               ATHR = RH8I*HI**3/12.0
                                                                                                                                                                                                                           EPHI(2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           = ZBRIN-HI-1/2.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          = ZBRIN-HI-1/2.0
                                                      XD33= XK33*HI**2/12.0
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                                                                                                                                                                                                                                                                                  * HI /PERM
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             YBARØ = HI/2.0-ZBRØUT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           YBARI = ZBRIN-HI/2.C
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        BARI = ZBRIN-HI/2.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            (2.0*(E1*H1+E2*HB))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              (2.0*(E1*HI+E2*HB))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    UNEQUAL FACE SHEETS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XGPT(2) * ZBHØUT * HØ
EMP1/TEMP3
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ROI = RO-YBARI*SN
                                     XK33= XGPT(1)*·HI
                                                                                                                                                                                      EQUAL SHEETS
                                                                          0.0
                                                                                                             VBARB = 0.0
                                                                                                                                                                                                                                                               XK11= ETSUM
                                                                                                                                                   GB TB 55
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                                                                          YBARI
                                                                                            YBARC
                                                                                                                                                                                                                                                                                                                                                                                                                                                    I / PERM
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XMERD = DD*ØMEGA*CS
XPRES = -DD*ØMEGA*SN
XMØNT = -{D1*CTH+D2*CPH+D3*YBARI+D4*YBARC+D5*YBARØ}*@MEGA*CS
A2ERØ = CC
                Ξ
ABNE = C1*CTH+C2*CPH+C3*YBARI+C4*YBARC+C5*YBARB
                                                                                                                                                                    XMENT = -(D3*YBARI+D4*YBARC+D5*YBARB)*BMEGA*CS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XD33= XD33 + GJPH/(4.0*SPH)+ GJTH/(4.0*STH)
                                                                                                                                                                                                  ABNE = C3*YBARI+C4*YBARC+C5*YBARg
                                                                                                                                                                                                                                                                                                                                                                                                                           GØ- TØ (58,60,100),KLUE2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             COSB = COS(BETTA)
SN2TØ4 = 2*(SINB**4.)
D= SIH*(COSB*SINB)
                                                                                                                                                                                                                                                                                                                                                                                                  01+02+03+04+05
                                                                                                                                                                                                                                                                                                               FISPH= ES# XIPH/SPH
                                                                                                                                                                                                                                                                                                                             EISTH= ER* XITH/STH
                                                                                                                                                                                                                                                                                                                                            - RHOR * ROR * TBARR
                                                                                                                                                                                                                                                                                                                                                         - RHBS*RBS*TBARS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        XC11= EASTH*CTH
XC22= EASPH*CPH
XD22 = -XD22-EISPH
                                                                                                                                                                                                                                                                                                                                                                                                                                                        ST. CLUE (11, 12, 13)
                                                                                                                                                                                                                                                                                    EASTH=ER*ATH/STH
                                                                                                                                                                                                                                                                                                  EASPH=ES*APH/SPH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          RWA CLUE (1,2,3)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 SINB =SIN(BETTA)
                                                                                                                                                                                                                                            IBARS = APH/SPH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   CONTINUE
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XMBNT = -(D1*CTH+D3*YBARI+D4*YBARC+D5*YBARB)*BMEGA*CS
                                                                                                                                                                                               SN4TØ2 = 4.#SINB2
XD22 = -XD22-2.0#CØSB##3#EDI-SN4TØ2#CØSB#GRI
TB= 2.0# BETTA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XK12=XK11*XNUTP + (EASTH*SNB*BNEC2B/CSB)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XC22= EASTH*CTH* (CSB/SNB * BNEC2B)
XD12=-XD11*XNUTP- EISTH*(SNB*BNEC2B/CSB)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 ABNE = CI*CTH+C3*YBARI+C4*YBARC+C5*YBARB
                                                                                                                                                                                                                                                                                                                                        XK12= XK11 #XNUTP + (2.0 #CBSB#SINB2#ED)
                                                                                                                                                                                                                                                                            1¢2*GRI)/ CØSB) + (2.0¢CØSB*SINB2*EDI)
XD12 = -XD11*XNUTP-(2.0¢CØSB
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        UNECZB=(1.0+ CS2B)/2.
SCB2 =(SNB-CS2B*SNB + 2.)/(2.0*CSB)
SN2B =SIN(TBETTA) /2.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XC11= (EASTH*CTH* SCB2 )
XC15=EASTH*CTH*( SNB* @NEC28/CSB )
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   (022 = -XD22-E1STH*(CSB/SNB*RNEC2B)
                                                                                                                                   GRI= ER* 12/(2.0*(1.0 + XNUTP)*D)
XC11 = CTH*SN2TØ4/CØSB*ED
EDI = ER*XITH/D
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XK22=XK22+ EASTH*(CSB/SNB*ØNEC2B)
                                         HL = 2.0*(ABS(ZETTA)-ABS(CTH))
                                                                                                                                                                                                                                                                                                                     1 *S INB2*EDI) - (SN4TØ2*CØSB*GRI)
                                                                                                                                                                                                                                                                                                                                                                                                                     KD11 = -XD11-SN2T04*ED1/C058-(
                                                                             XC22 = 2.0*CTH*CØSB**3*EC
XC15 = 2.0*CTH*CØSB*SINB2*ED
                                                                                                                                                                                                                                                                                                                                                                              KK33=XK33+(2*CØSB*SINB2*ED)
                                                                                                                                                                                                                                                         XD33 = XD33+((4.0*CBS(TB)*
                                                                                                                                                                                                                                                                                                                                                                                                 KK 11=XK 11+( SN2TØ4*ED/CØSB
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        IF (KGEBM.NE.4) GB TB 105
                                                                                                                                                                                                                                                                                                                                                           KK22=XK22+(2*CØSB**3*ED)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XMERD = (DD-D2) * BMEGA*CS
                                                            [2=(ATH**3.)/(3* HL**2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 KD11=-XD11- EISTH*SCB2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XD33= XD33+ EISTH*SN2B
XK2I = XK12
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XK33=XK33+ EASTH* SN2B
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XK11=XK11+ EASTH*SCB2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      KC16=EASTH*CTH*SN28
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    TBETTA= 2.0*BETTA
CS28= CØS(TBETTA)
                                                                                                                                                                                                                                                                                                                                                                                                                                      SN4102*C058*GRI)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    1SG CLUE, (1,2,3)
                  SINB2= SINB##2.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              SNB =SIN(BETTA)
CSB =C@S(BETTA)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           AZERØ = CC-C2
                                                                                                                  xC16 = xC15
                                                                                                                                                                                                                                                                                                                                                                                                                                                         XK21 = XK12
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  GØ TØ 108
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             CONTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         103 CONTINUE
                                                                              95
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             100
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009509
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XMTPH =(EPHK] # TEMP8 # (HI*TEMP71/3.0+ TI*TEMP61)) - (EPHK2 # I TEMP8*(HI*TEMP72/3.0+TØ*TEMP62))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XMTPH = EPHK1+0.5+(H1++2+TEMP71/3.0+T1+H1+TEMP61)-EPHK2+0.5+(H8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 #{H] **2*TEMP71/3.0+TI*HI*TEMP61}-ETHK2*C.5*(HB
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            TEMP8#
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                FEMP8*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          - (ETHK2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       813 TI = (E2*H0**2-E1*H1**2+2.0*E2*H0*T)/(2.0*(E1*H1+E2*H0))
T0 = (E1*H1**2-E2*H0**2+2.0*E1*H1*T)/(2.0*(E1*H1+E2*H0))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     TEMP8 * (HI*TEMP71/3.0+ TI*TEMP61))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XNTTH = ETHK1*0.5*(HI*TEMP61)+ETHK2*0.5*(HØ*TEMP62)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           (HI*TEMP61)+ EPHK2*0.5*(HØ*TEMP62)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            TEMP8*TEMP61 + ETHK2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            TEMP8*TEMP61 + EPHK2
                                           IF(ISTAB.NE.1.AND.ISTAB.NE.3) ATWB=AA+ATHR
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            = (HI*(E2-E1)+2.0*E2*T)/(2.0*(E1+E2))
= (HI*(E1-E2)+2.0*E1*T)/(2.0*(E1+E2))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          TEMPS # (TE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               814 TEMP10=((-XK11*XD11)**.5)/(48.0**.5)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              I TEMP8*(HI*TEMP72/3.0+TØ*TEMP62))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              TEMP71= 2.0* TII +TIK-3*TEFREE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      +TØK-3*TEFREE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            ETHK2 = ETHET(2) *TEMP12/TEMP3
                                                                                     GØTØ (716,714,715,714),KELVIN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ETHET(1) *TEMP11/TEMP3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1**2*TEMP72/3.+ TØ*HØ*TEMP62)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1**2*TEMP72/3.+ TØ*HØ*TEMP62)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    TEMP61= TII+ TIK-2* TEFREE TEMP62= T00+ T0K-2* TEFREE
                                                                                                                                                                                                                                                                                                                                                                                                                                       TEMP3 = 1-XNUPT *XNUTP
                                                                                                                                                                                                                             ST (NRBH+1,LL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XMTTH = (ETHK1 *
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XNTPH= EPHK1*0
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XMENT = C.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XMTTH= ETHK
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                     CONTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      TEMP72=
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 EPHK1
                 105
                                                                                                             911
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| IEM11 = ((-XK22*XD22)**,5)/(48.0**,5)
| XNITH = (XK11/4.0 *TEMP11)* TEMP61 + (XK11/4.0*TEMP12) * TEM
| XNITH = (XK22/4.0 *TEMP11)* TEMP61 + (XK22/4.0*TEMP22) * TEM
| XMTH = TEMP10*(TEMP11*TEMP71 - TEMP12* TEMP72)
| XMTH = TEMP1 *(TEMP11*TEMP71 - TEMP22* TEMP72)
| R889 RETURN
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          THEN USE
                                DISTANCE FROM AXIS OF REV. TO POINTS
ON SHELL MENDIAN.
DISTANCE ALONG AXIS OF REV. TO THE
INTERSECTION OF THE CORRESPONDING RI(I) AND
THE AXIS OF REV.
                                                                                                                                                                                                                                                                                                                                                                             PASS SPLINE CURVE THRØUGH INPUT PØINTS ØN SHELL MERIDIAN, AND
                SUBROUTINE TEMBEG
This Subroutine Calculates the Geometry for a shell segment.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 COMPUTE MERIDIONAL ARC LENGTH TO INTERPOLATED POINTS BY NUMERICAL INTEGRATION (SIMPSONS RULE). SINCE SIMPSONS RULE REQUIRES AN EVEN NUMBER OF PARTITIONS, INTERPOLATE A POINT HIDWAY BETWEEN EACH HIDMAY BETWEEN EACH PAIR OF POINTS USING SUBROUTINE PLINE.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     CALL PLYNE (ZI,RI,NRZIN,CI,ZI(I)+DZ2,FAKEI,DRDZM,FAKE2)
SØUT(I+1) = SØUT(I) + DZ6*(FUN(DRDZ(I)) + 4.0+FUN(DRDZM). +
FUN(DRDZ(I+1)))
                                                                                                                                                                                     /SNILPS/ ANG, PSI(100), RAD(100), CURI(100), CUR2(100), DRIDP(100), ZI(14), RI(14), NRZIN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       USE SPLICØ TØ REPRESENT RI(I) AS A FUNCTIØN ØF SØUT(I). T
SPLINE TØ INTERPØLATE RADD AND CØRRESPØNDING DERIVATIVES.
THESE, CØMPUTE THE TWØ PRINCIPAL RADII ØF CURVATURE,
                                                                                                                                                   - NUMBER OF (RI,ZI) PAIRS READ AS INPUT.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             S(I) = FLØAT(I-1)*BLDH1
CALL PLYNE (SØUT;RI,NRZIN,CI,S(I);RAD(I);RADD(I);RADD2)
IF (ABS(RADD(I)).GI.1.0) RADD(I)=1.0
                                                                                                                                                                                                                      DIMENSIBN CI(4,13), DRDZ(14), SBUT(14), S(101), RADC(100)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              CALL PLYNE (21,RI,NRZIN,CI,ZI(I),FAKE1,DRDZ(I),FAKE2)
                                                                                                                                                                                                                                                                                                                                                                                            COMPUTE DR/DZ AT THESE POINTS.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  FACTOR = SQRT(1.0-RADD(1)**2).
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            BLDH1 = S@UT(NR2IN)/99.C
CALL PLYC@ (S@UT,RI,NR2IN,CI)
D@ 110 I=1,100
                                                                                                                                                                                                                                                        FUN(ARG) = SQRT(1.0 + ARG**2)
                                                                                                                                                                                                                                                                                                                                                                                                                             PLYCA (ZI,RI,NRZIN,CI)
                                                                                                                                                                                                                                                                                                                                           IF (ANG.EQ.B) AMULT = -1.0
                                                 THE INPUT VARIABLES ARE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     022=(21(1+1)-21(1))/2.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  CURI(I) = -RADD2/FACTOR
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  CUR2(1) = FACTOR/RAD(1)
                                                                                                                                                                                                                                                                                          = 3.1415926/180.0
                                                                                                                                                                                                                                                                                                                                                                                                                                            NDELZ = NRZIN - 1
                                                                                                                                                                                   /SNILPS/
                                                                                                                                                                                                                                                                                                                                                                                                                                                               DØ 60 I=1,NR2IN
FOR, IS TEMBEG, TEMBEG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      DØ 70 I=1,NDELZ
                                                                                                   (1)17
                                                                                                                                                      NR Z IN
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             = 1/R1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     026=022/3.0
                                                                                                                                                                                                                                                                                                                           AMULT = 1.0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      SBUT(1) = 0.
                                                                                                                                                                                                                                                                                                           DATA B/-E
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  CONTINUE
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             CURZ
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                                                                                                                                                                                                                                                                                          RADS
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DB 180 J=1,100

CBSPS1 = AMULT*RADD(J)

PSI(J) = ARCBS(CBSPS1)

SINPS1 = -AMULT*RADI(J)*CUR2(J)

F (ANG.Eq.B) GB TB 179

PSI(J) = 2.0*3.1415926-PSI(J)

179 CBNTNUE

CUR2(J) = -AMULT/CUR1(J)

CUR2(J) = -AMULT/CUR2(J)

IF (J.Eq.1) GB TB 180

IF (J.Eq.2) GB TB 180

IF (J.Eq.2) GB TB 181

I = 2

DRIDP(J-1) = (CUR1(J-1))/(PSI(J)-PSI(J-1))

BB 1F (ANG.Eq.B) GB TB 190

DRIDP(J-1) = (CUR1(J-1)-CUR1(J))/(PSI(J-1)-PSI(J))

BB 180 CBNTNUE

DRIDP(J-1) = BRIDP(S)

DB 42 J=1,100

DB 10P(J) = DR 10P(J)*O.1

BE TB 180

DB 10P(J) = DR 10P(J)*O.1

BB 10P(J) = DR 10P(J)*O.1
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                                     SUBRBUTINE FØR SPLINE FIT INTERPØLATIØN IN THE TABLE ØF VALUES (XI,YI) TØ (XM,YM), WHENE M MAY BE AS LARGE AS 100, HENE THE CONSTANTS C(1,K),C(2,K),C(3,K) AND C(4,K) ARE ALREAD COMPUTED
                                                                                                                                                                                                                                                                                                                                                                              VINT = YINT + (XINT-X(K))*(C(2,K)*(XINT-X(K))**2+C(4,K))
70 DYDX=-3.C*(C(1,K)*(X(K+1)-XINT)**2-C(2,K)*(XINT-X(K))**2.
                                                                                                                                                                                                                                                                                                                                                                                                                                   D2YDX2=6.0*(C(1,K)*(X(K+1)-XINT)+C(2,K)*(XINT-X(K)))
                                                                                                                       SUBRBUTINE ALSO COMPUTES DY/DX AND D2Y/DX2 AT XINT.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              WRITE (6,90)
FURMAT (31H OUT OF RANCE FOR INTERPOLATION)
                                                                                                                                                                                                                                                       F (XINT-X(K+1)) 60,40,50
FOR, IS PLYNE, PLYNE
                                                                                                                                                                               YINT = Y(1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                             RETURN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      RETURN
                                                                                                                                                                                                                                                                                                                                                           60 YINT
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1200200 1200210 1200220 1200230 200080 200090 200100 200150 200150 200160 200170 200180 1,K),C(2,K),C(3,K) AND C(4 K). $(1) = 2 \cdot 0 + (P(K-1) + P(K)) - P(K-1) + A(K-1, 3)$ = B(K) - P(K-1) + B(K-1)Z(K) = B(K)-A(K,3)*Z(K+1) Z(1) = -A(1,2)*Z(2)-A(1,3)*Z(3)= (Y(K+1)-Y(K))/D(K).0-D(1)/C(2) CØ 40 I=1, MN FOR, IS PLYCO,

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X 1 1 1-1

10 20

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SUBROUTINES ODE1 AND ODE2

Subroutine LEBEGE calls either ODE1 or ODE2, as necessary, and various geometric and trigonometric clues, as well as the predicted values of the variables for the differential equations, are passed to this subprogram via label common area LASTEQ.

The equations in ODE1 and ODE2 are identical to those in subroutines DIF1 and DIFF2 respectively, with the addition of the auxiliary equations for YAQPH, and YAQTH. Subroutines ODE1 and ODE2 perform the final integration for each segment in the structure utilizing the initial conditions previously obtained, and return these values to LEBEGE via label common area LASTEQ.

The ODE1, ODE2 flow charts are identical to the DIF1, DIFF2 flow charts, respectively

| FORTRAN CODE | ENGINEERING SYMBOLS (REF. 1) |
|---------------|------------------------------------|
| | |
| YANPT | N _{\$\phi\theta\theta}\$} |
| YAQPH | Q _p |
| YAQTH | Q _e |
| Ү АОРН | $\Omega_{f \phi}$ |
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                                                                                                                                                                                                                                          COMMON STORY(16), XMAT(110,10), STD(10), SADUS(30), RADUS(30)
COMMON TADUS(30), UADUS(30), SAVIIC(900)
COMMON XN, TEFRE, TIC, PHI, STOP RESTOP, RIICK, GI, XNL(3), NH
COMMON NST(30), NNL(30), NNMAT(20), SAVIC(30), SAVSTP(30), JRTIC(30)
COMMON JRSTOP 30), NNEG, NNF, NC, NIX, IERROR, KGEOM, ICEOM, ISTAB
COMMON XELVIN, IBEGIN, NPROB, NSEG, NERROR, 0, THICK, NOJS, NL INKS, NLCASE
COMMON NISKL, NZ, NOC, LINPUT, NTKL, NPASS, XNI, KGC, NR INGS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    EQUATIONS FOR SHELLS OF REVOLUTION ( PHI COORDINATE )

1 YANTH = XNUPT*YPRED([+1)+(XK11-XNUPT**2*XK22)*(XN*YPRED[[+4)+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XNUPT*YPRED(I+3)-(XD11-XNUPT**2*XD22)*XLRB*(X1RB*(XN*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              RI*(-2.0*YPRED(I)*CSIRØ+XN*YANTH*XIRØ-XN*YAMTH*SN*
XIRØSQ-YAMPT*CSIRØ*(XIRI-SNIRØ))-RI*K*(XFTHLD+XMPHLD*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               /LASTEQ/ YRED(16) YDB1(16) YASAVE(16),
YANTH,YAMTH,YAMPT,YANDT,YABPH,YAQPH,YAQTH,YAJPH,
S,SN,CS,SNSQ,CSSQ,TAN,SEC,CN,XICS,XISN,TN,
XIRØ,XIRØSQ,XISNRØ,XICSRØ,CNIRØ,SNIRØ,CSIRØ,
XIRI,XIRZ,CSIRI,CSIRZ,SNIRI,XIRISQ,RZSQ,RØ,BESQ,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   ZBRIN, ZBRØUT, SCRIPA, SCRIPI, SIFIN, SIFØUT, TZEPH, TZETH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XNUIP.XNUPT,XC11,XC22,XC15,XD33,XD22,XD21,XD12,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             (X1*XFZEL1+X2*XFZEL2))-R1*SN1RØ*(YA@PH*(X1*SAVY(1)+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         YPRED(1+7)+YPRED(1+4)*(CSIR1-CNIR0)+XN*YPRED(1+5)*
(SNIR0+XIR1)+2.0*XN*YPRED(1+6)*CSIR0+YPRED(1)*SN/
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            M, I, SITIN, SITBUT, SIPIN, SIPBUT, TPTIN, IPTBUT,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           YAMPT+SNIR@/XK33)+R1+YABPH+(X1+SAVY(3)+X2+SAVY(6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             XNITH, XNIPH, XMITH, XMTTH, XFIHLD, XFPHLD, XFZELD, XMTHLD, XMPHLD, ETHEI (2), EPHI (2), XGPI (2), ALPHIH (2), ALPHIH (2), ALPHIH (2), ALPHIH (3), 
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       YPRED(I+5)*CS-YPRED(I+6)*SN)*XIRB+K*(XNUPT*XNTPH-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  SNIR@)-(YO@T(1+4)*(X1*XFPHL1+X2*XFPHL2)+R1*YA@PH*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  /PRED(1+4)*SN-XNSG*YPRED(1+6))+YPRED(1+7)*CS)+K*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                -RI+X3*BMEGA+(AZERB+YPRED(I+4)-ABNE+YABPH+SN/RB+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                RI#(YPRED(I+6)*x1RI+(1.0/(XK22-XNUTP**2*XK11))*
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               COMMON /PLS/ BMEGA, IMBRD, XMERD, XPRES, XMENT, AZERB, ABNE, ATWB
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    YPRED(1+2)-YPRED(1+1)*(X1*SAVY(3)+X2*SAVY(6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         [-1.0/((RB/X033)+(SNSQ*X1RB/XK33)))*(-2.0*XN*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         X2*SAVY(4))-YANPT*(X1*SAVY(3)+X2*SAVY(6)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XK33+SN*YABPH*(X1*SAVY(3)+X2*SAVY(6)))
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                                                                                                                                                                  DØUBLE PRECISIØN SAVTIC, TIC, PHI, STØP, RESTØP, RTICK
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               , XNPHI, BETTA, ZETTA, SAVY (8), XC16
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XN*YPRED(I+6)*XIR8-YPRED(I+4)*SNIR8
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              EQUIVALENCE (XNL(1),XI), (XNL(2),X2), (XNL(3),X3)
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                                           SUBRBUTINE BOEL (XFPHL1, XFZEL1, XFPHL2, XFZEL2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             F(ISTTAB.GE.10)GB TB 7786
HE FBLLBWING EQUATIBNS ARE THE -THICK- SET
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     RØSG, XNSQ, BETA, RI, RZ, SI, RIDØT, RISQ,
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                                                                                   INTEGER SAVJIC, SAVSIP, Q, THICK
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                                                                                                                                                                                                          DAUBLE PRECISION YPRED
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                                                                                                                              -RI+((EPSITH+EPSIPH)+(XI*XFPHLI+X2*XFPHL2)-YPRED(I+7)+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              YAMPI (1.0/(($4C5/XD33)+($N#TN\(XX33*S))) $4(-2.0*XN*YPRED[1+7)-
YAMPI (1.40)*SNY54XNYPRED[1+5)*TN\(S+2.0*XN*YPRED[1+6]/S+YPRED
[1]*SN/XX33+SN*YA@PH#(X1*SAVY(3)+X2*SAVY(6)))
YAJPH = YPRED[1+2)-YPRED[1+1)*(X1*SAVY(3)+X2*SAVY(6))
-YPRED[1+2)-YPRED(1+1)*(X1*SAVY(3)+X2*SAVY(6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       )+YPRED(1+5)*CS-YPRED(1+6)*SN)+K*(XNUPT*XNTPH-XNTTH)
YAMTH=XNUPT*YPRED(1+3)-(1,0/5)*X1CS*(XD11-XNUPT*Z*XD22)*((1,0/5)*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            {X|*XFPHL]+X2*XFPHL2)+YAØPH*(X|*XFZEL1+X2*XFZEL2)}-
Tan/S*(YA@PH*(X|*SAVY(I)+X2*SAVY(4))-YANPT*(X|*SAVY(3)
                                                                                                                                                                                                                                                                                                                                                               -RI*X3*BMEGA*(AZERØ*YPRED(I+6)-XN/RB*(AØNE*YPRED(I+4)-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    YANTH=XNUPT#YPRED(1+1)+(XK11-XNUPT##2*XK22)#(X1CS/S)#(XN#YPRED(1+4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    +YPRED(1)/XK33+YA@PH+(X1*SAVY(3)+X2*SAVY(6))
=-2.0*YPRED(1)/S+XN*YANTH*XICS/S-XN*YAMTH*SN*X1CS**2/S**2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           -X3*BMEGA*(AZERB*YPRED(I+6)-XN/(S*CS)*(ABNE*YPRED(I+4)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    {S**2*CS**2}-K*XFPHLD-(EPSITH+EPSIPH)*(X1*XFPHL1+X2*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            -YPRED(I+1)/S+YANTH/S-XN*YPRED(I)/(S*CS)-XN*YAMPT*SN/
                     XIRI#(YD01(1+5)-YPRED(1+6))+YPRED(1+7)*(X1*5AVY(3)+
                                                                                                                                                                                                                                                                                 XFZEL1+x2*XFZEL2)+YPRED(I+7)*(X1*XFPHL1+X2*XFPHL2))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      +YAMPI*IAN/S**2-K*(XFIHLD+XMPHLD*IAN/S)-(YDBT(I+4)*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        (1.0/(XK22-XNUTP**2*XK11))*(YPRED(I+1)-XNUTP*YANTH+
                                                                                                                                                                                                                                                                                                                                                                                                               RI#(YAMIH#CSIRØ-YPRED(I+3)#CSIRØ-2.0*XN*YAMPT*XIRØ+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         YDGT([+4)=(1.0/S)+(YPRED([+4)+XN*YPRED([+5)*X1CS+YAMPT*TN/XK33)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       -2.0#XN#YAMPT/(S##2#CS)+K#(XN#XMPHLD#X1CS/S-XFZELD)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        (X] *XFPHL]+X2*XFPHL2)-X1CS/S*XN*(YANPT*(X]*SAVY(3)+
                                                                           R1*(CS1R0*(YANTH-YPRED(I+1))-XN*X1R0*(YPRED(I)+
YAMPT*(SN*X1R0+XIR1))+YPRED(I+2)*XIR1)-R1*K*XFPHLD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                -(EPSITH+EPSIPH)*(X)*XFZEL]+X2*XFZEL2)-YPRED(I+7)*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   K#(XNTPH-XNUTP*XNTTH))-YPRED(I+7)*(X1*SAVY(3)+X2*
                                                                                                                                                                                                         RI#(-YPRED(I+2)#CSIR@-YANTH#SNIR@-YPRED(I+1)#X1R1
                                                                                                                                                                                                                                                                                                            -RI#XIR@#XN#(YANPT#[X]#SAVY(3)+X2#SAVY(6))-YA@PH#
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        R1*(YPRED(1+7)-YPRED(1+5)*X1R1)
R1*(1.0/(XD22-XNUTP*+2*XD11))*(-YPRED(1+3)+XNUTP*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XICS*(XN*YPRED(I+4)*SN-XNSQ*YPRED(I+6))+YPRED(I+7)*CS)-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               -YPRED[1+2)/S-YANTH#TAN/S+XNSQ#YAMTH/(S##2#CS##2)
                                                                                                                                                                                                                                 +XNSQ+YAMTH+X1RBSQ-2.0+XN+YAMPT+CS+X1RBSQ)+R1+K+
                                                                                                                                                                                                                                                              (XN*XMPHLO*X1RØ-XFZELD)-R1*((EPSITH+EPSIPH)*(X)*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                  +R1+X3+(BMEGA+(ARNE+YPRED(I+5)+ATW0+YPRED(I+7)))
XIRØ#(XN#YPRED(I+4)+YPRED(I+5)#CS-YPRED(I+6)#SN)
                                                                                                                                                                                -R1 * X3 * BMEG A * ( A ZER Ø * YPRED ( I + 5 ) + A BNE * YPRED ( I + 7 ) )
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 (1.0/(S#CS))#(XN#YPRED(I+4)+CS#YPRED(I+5)-SN#
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       -X3+BMEGA+(AZERB+YPRED(I+5)+ABNE+YPRED(I+7))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       -x3*BMEGA*(AZERB*YPRED(I+4)-ABNE*YABPH+TN/S*
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                X2+SAVY(6))-YABPH+(X1+SAVY(1)+X2+SAVY(4)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               XFPHL2)+YPRED(I+7)*(X1*XF2ELI+X2*XF2EL2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          = XN*YPRED(1+6)*XICS/S-YPRED(1+4)*TAN/S
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  (ABNE*YPRED(1+4)-ATMB*YABPH))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           YAMTH-K# (XMTPH-XNUTP *XMTTH))
                                                                                                                                                                                                                                                                                                                                       (((+)\A\8\X\(1)\A\8\X\)
                                                                                                                                                        {X] *XFZEL] + X2 * XFZEL2]}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       K+(XMTTH-XNUPT+XMTPH)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   = YPRED(I)+YAMPT#IAN/S
                                                                                                                                                                                                                                                                                                                                                                                                                                          VAJPH+K+XMTHLD)
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                                                     X2*SAVY (6))
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                                                                                                                                                                                                                                                                                    YAMTH=XNUPT*YPRED(1+3)-(XIRB*(XD11-XNUPT**2*XD22))*(XIRB*(XN*YPRED
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XIR0*#2*(XN*YPRED(I+4)#SN-XN*#2*YPRED(I+6))+YPRED(I+7)#CS*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    -{YDØ1{1+4}*(X1*XFPHL1+X2*XFPHL2)+YAØPH*(X1*XFZEL1+
X2*XFZEL2))-X1RØ*(YAØPH*(X1*SAVY(1)+X2*SAVY(4))-YANPT*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             [XK22+XC22**2/XD22]])*(XN*YPRED(I+4)+YPRED(I+5)*CS-YPRED(I+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        *SN)-(XC11+XK12*XC22*XD21/XD22*(1.0/(XK22+XC22**2/XD22)))*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          (X1 + SAVY(3) + X2 + SAVY(6)) - YABPH*(X1 + SAVY(1) + X2 + SAVY(4)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 (XC22/XD22) # (YPRED(I+3) +K*XMTPH))-K*XNTTH+(X1RØ*XK11-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          -X012#(XC22/(XC22##2+XK22#XD22))#(YPRED(I+1)+K#XNTPH)
                                                                                                                                                                                                                                YANTH=XNUPT*YPRED(I+1)+(XK11-XNUPT**2*XK22)*(X1R@*(XN*YPRED(I+4)-
                                                                                                                                                                                                                                                                                                                                                                           YAMPT=(-1.0/(RØ/XD33)+(X1RØ/XK33))*(-2.0*XN*YPRED(1+7)+XN*X1RB*
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          YOØT(1+5)+YPRED(1+7)*(X1*SAVY(3)+X2*SAVY(6)).
-XN*XIR@*YPRED(1)-XN*YAMPT*XIRØSQ-K*XFPHLD-(EPSITH+
EPSIPH)*(X1*XFPHL1+X2*XFPHL2)+YPRED(1+7)*(X1*XF2EL1+
  YAMTH/S-YPRED(1+3)/S-2.0*XN*YAMPT/(S*CS)+YAJPH+XMTHLD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 YDØT(1+7) = (1.0/(XD22-XNUTP**2*XD11))*(-YPRED(1+3)+XNUTP*YAMTH+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         XN*YANTH*X1RB-XN*YAMTH*X1RBSQ-K*(XFTHLD+XMPHLD*X1RB)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               [1.0/(XK22-XNUTP**2*XK11))*(YPRED([+1)-XNUTP*YANTH+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  XK12*(1.0/(XK22+XC22**2/XD22))*(YPRED(I+1)+K*XNTPH+
                                                                                                                YOBT(1+7)=(1.0/(XD22-XNUTP**2*XD11))*(-YPRED(1+3)+XNUTP*YAMTH-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      -x3*BMEGA*(AZERB*YPRED(I+6)-XN/RB*(ABNE*YPRED(I+4)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           K+(XNTPH-XNUTP+XNTTH))-YPRED(I+7)+(X1+SAVY(3)+X2+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  YPRED(1+7)*(X1*XFPHL1+X2*XFPHL2)-X1R8*XN*(YANPT*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      -YANTH#XIRB+XNSQ#YAMTH#XIRBSQ+K#{XN#XMPHLD#XIRB-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               100T(1+4)=XN*YPRED(1+5)*X1R0+YPRED(1)/XK33+YAMPT*X1R0/XK33
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XFZELD)-(EPSITH+EPSIPH)+(X1+XFZEL1+X2*XFZEL2)-
                                                                                                                                                                                                                                                                                                                                                                                                       YPRED(1+5)+YPRED(1)/XK33+YABPH+(X1+SAVY(3)+X2+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      -x3#BMEGA#{AZERB#YPRED{I+4}-ABNE#YABPH+1.0/RB#
                                                         +X3 * ( BMEGA * ( ABNE * YPRED ( I + 5 ) + ATWB * YPRED ( I +7 ) ) )
                                                                                                                                                                                                                                                                                                                  (I+4)-XNSQ*YPRED(I+6)))+K*(XNUPT*XMTPH-XMTTH)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          +X3*(@MEGA#(ABNE*YPRED(I+5)+ATHØ*YPRED(I+7)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                             YPRED(1+2)-YPRED(1+1)+(X1*SAVY(3)+X2*SAVY(6))
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                                                                                                                                                                                                                                                              YPRED(1+6)))+K*(XNUPT*XNTPH-XNTTH
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           X1*SAVY(3)+X2#SAVY(6)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             K*(XNUTP*XMTTH-XMTPH))
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       -RI*((EPSITH+EPSIPH)*(XI*XFPHLI+X2*XFPHL2)-YPRED(I+7)*
                                                                                                                                                                                                                                                                                            RI*(YPRED(I+4)*CSIR0+XN*YPRED(I+5)*XIR8+YPRED(I)/XK33+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          'PRED(I+4)+YPRED(I+5)*CS-YPRED(I+6)*SN)-(XC22*XD21/XD22
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               )*(X1RBSG*(XN*YPRED(1+4)*SN-XNSQ*YPRED(1+6))+YPRED(1+7)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           -R1*X3*BMEGA*(AZERB*YPRED(I+6)-XN/RB*(ABNE*YPRED(I+4)-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      (XC22/X022)*(YPRED(I+3)+K*XMTPH))-K*XNTTH+(1.0/(CS*S))
R1*(YPRED(I+6)*X1R1-YPRED(I+7)*(X1*SAVY(3)+X2*SAVY(6))
                                                                                                                                                                                                                                                                                                                                                                      XIR8SQ-YAMPT*CSIR8*(XIRI-SNIR8))-R1*K*(XFTHLD+XMPHLD*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               +(XK22/(XC22**2+XK22*XD22))*(YPRED(I+3)+K*XMTPH)-(XK22*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            +(1.0/(XK22+XC22**2/XD22))*(YPRED(I+1)+K*XNTPH+(XC22/
                                              XC22**2+XK22*XD22))*(X1RØSQ*(XN*YPRED(1+4)*SN-XNSQ*YPRED
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = R1+({-XC22/(XC22**2+XK22*XD22))*(YPRED(I+1)+K*XNTPH-
                       I+4)+YPRED(I+5)*CS-YPRED(I+6)*SN)+(XDII-XD12*XK22*XD21/(
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XFZEL1+X2*XFZEL2)+YPRED(1+7)*(X1*XFPHL1+X2*XFPHL2))
                                                                                                                                                                                                                                                                                                                                                                                                                     (XI*XFZELI+X2*XFZEL2))-RI*SNIRØ*(YAØPH*(XI*SAVY(1)+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XIR1 # (YDØT (I+5) - YPRED(I+6)) + YPRED(I+7) # (X1 # SAVY (3) +
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     = XK12*(1.0/(XK22+XC22**2/XD22))*(YPRED(I+1)+K*XNTPH+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       RI#(YAMTH#CSIRB-YPRED(I+3)#CSIRB-2.0#XN#YAMPT#XIRB+
                                                                                                                                                                                                                                                                                                                     YAMPT#SNIRØ/XK33)+R1#YABPH#(X1#SAVY(3)+X2#SAVY(6))
                                                                                                                                                                                                                                                                                                                                             RI#(-2.C*YPRED(I)#CSIRØ+XN*YANTH*XIRØ-XN*YAMTH*SN*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             YAMPI#(SN*XIR@+XIRI))+YPRED(I+2)*XIR1)-R1*K*XFPHLD
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                                                                                                                                                YPRED(1+7)+YPRED(1+4) # (CSIR1-CN1RØ)+XN #YPRED(1+5) #
                                                                                                                                                                                                                                                                                                                                                                                             SN1R8)-(YD81(1+4)*(X1*XFPHL1+X2*XFPHL2)+R1*YA8PH*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             RI*(-YPREU(I+2)*CSIRO-YANTH*SNIRO-YPRED(I+1)*XIRI
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            -RI*XIRD*XN*(YANPT*(XI*SAVY(3)+X2*SAVY(6))-YABPH*
                                                                                                                                                                       (SN1RB+X1R1)+2.0*XN*YPRED(1+6)#CS1RB+YPRED(1)*SN/
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           (XN*XMPHLU*X1RØ-XFZELD)-R1*((EPSITH+EPSIPH)*(X1*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   -R1*X3*BMEGA*(AZERØ*YPRED(I+4)-AØNE*YAØPH+SN/RØ*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    +XNSQ*YAMTH*XIR8SQ-2.0*XN*YAMPT*CS*XIR8SQ)+RI*K*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        +R1*X3*(BMEGA*(ABNE*YPRED(I+5)+ATWB*YPRED(I+7)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                = XIR@*(XN*YPRED(I+4)+YPRED(I+5)*CS-YPRED(I+6)*SN)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        RI*(CSIRB*(YANTH-YPRED(I+1))-XN*XIRB*(YPRED(I)+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   -R1+X3+BMEGA+(AZERB+YPRED(I+5)+ABNE+YPRED(I+7))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       RØ)*(XN*YPRED(I+4)+YPRED(I+5)*CS-YPRED(I+6)*SN))
                                                                                                                         (+1.0/((R8/X033)+(SNSQ*X1RB/XK33)))*(-2.0*XN*
                                                                                                                                                                                                                   YPRED(I+2)-YPRED(I+1)*(X1*SAVY(3)+X2*SAVY(6))
                                                                                                                                                                                                                                                                                                                                                                                                                                       X2*SAVY (4))-YANPT* (X1*SAVY (3)+X2*SAVY (6)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   XD22)#(YPRED([+3)+K*XMTPH)-XK21*X1R@*(XN*
                                                                                                                                                                                            XK33+SN#YA@PH#(X1#SAYY{3}+X2#SAYY(6)))
                                                                                             = XN*YPRED(I+6)*XIR@-YPRED(I+4)*SNIR@
                                                                                                                                                                                                                                             -YPRED(1+7)*(X1*SAVY(2)+X2*SAVY(5))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               = RI*(YPRED(I+7)-YPRED(I+5)*XIRI)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             *YPRED([+6))+YPRED([+7)*CS*X1RB)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             (ABNE*YPRED(I+4)-ATWB*YABPH)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   (X1 # SAVY(1) + X2 # SAVY(4)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              (X1*XF2EL1+X2*XF2EL2))
                                                                          ([+6))+YPREC([+7)*CS*X1RB)
                                                                                                                                                                                                                                                                    YPRED(I)+YAMPT#SNIRB
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    *(XK11-XK12*XK21*(
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ATWOOTA DPH))
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#2/XD22)))#(11.0/(S##2#CS##2))#(XN#YPRED(I+4)#SN-XNSQ#YPRED
                                                                                                                                                                                                                            XD21/(XC22**2+XK22*XD22))*((1.0/(S*CS)**2)*(XN*YPRED(I+4)*
                                                                                                                                                                                                                                                                                                                                                                   YPRED(1+4)*SN/S+XN*YPRED(1+5)*TN/S+2.0*XN*YPRED(1+6)/S+YPRED
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  =-2.0*YPRED(1)/S+XN*YANTH*XICS/S-XN*YAMTH*SN*XICS**2/S**2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                TAN/S#!YABPH#(X1#SAVY(1)+X2#SAVY(4))-YANPT#(X1#SAVY(3)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              -YPRED(1+7)*(X1*SAVY(3)+X2*SAVY(6))+(1.0/(XK22+XC22**2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                I+5)*CS-YPRED(I+6)*SN)-(XC22*XD21/XD22)*((1.0/(S**2*CS**
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              /(XC22**2+XK22*XD22))*((1.0/(S*CS)**2)*(XN*YPRED(I+4)*SN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               = XK12*(1.0/(XK22+XC22**2/XD22))*(YPRED(I+1)+K*XNTPH+
(XC22/XD22)*(YPRED(I+3)+K*XMTPH))-K*XNTTH+(XIRB*(XKI]-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 -X3*BMEGA*(AZER&*YPRED(I+6)-XN/(S*CS)*(ABNE*YPRED(I+4)
                                                                  -XD12+(XC22/(XC22++2+XK22+XD22))+(YPRED(I+1)+K+XNTPH)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              YD@T(1+7) = -(XC22/(XC22*#2+XK22*XD22))*(YPRED(1+1)+K*XNTPH-XK21*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            +(XK22/(XC22*+2+XK22*XD22))*(YPRED(1+3)+K*XMTPH}-(XK22*
                                                                                                    -K*XMTTH+XD12*(XK22/(XC22**2+XK22*XD22))*(YPRED(1+3)+
                                                                                                                                                                                               YPRED(I+4)+YPRED(I+5)+CS-YPRED(I+6)+SN)+(XD11-XD12+XK22+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                YOUT([+3)= YAMTH/S-YPRED(I+3)/S-2.0*XN*YAMPI/(S+CS)+YAJPH+XMTHLD
                                                                                                                                                                |S#CS)+XD12#XK21/|S#CS))#[XC22/|XC22##2+XK22#XD22)]#[XN#
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               (S**2*CS**2)-K*xFPHLD-(EPSIIH+EPSIPH)*(X1*XFPHL1+X2*
                                                                                                                                                                                                                                                                                                                                YAMPT=(-1.0/.((S*CS/XD33)+(SN*TN/(XK33*S))))#(-2.0*XN*YPRED(1+7)-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                -YPRED(I+1)/S+YANTH/S-XN*YPRED(I)/IS*CS)-XN*YAMPT*SN/
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 +YAMPT*TAN/S**2-K*(XFTHLD+XMPHLD*TAN/S)-(YD0T(I+4)*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 (X1*XFPHL1+X2*XFPHL2)+YAØPH*(X1*XFZEL1+X2*XFZEL2))-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            (X]*XFPHL]+X2*XFPHL2)-XICS/S*XN*(YANPT*(X1*SAVY(3)+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    /XD22))*(YPRED(I+1)+K*XNTPH+(XC22/XD22)*(YPRED(I+3)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               2))*(XN*YPRED(I+4)*SN-XNSG*YPRED(I+6))+YPRED(I+7)/S))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                YDØT(I+4)=(I.O/S)*(YPRED(I+4)+XN*YPRED(I+5)#X1CS+YAMPT*TN/XK33)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             2.0*XN*YAMPT/(S**2*CS)+K*(XN*XMPHLC*X1CS/S-XFZELD)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 XK22+XC22**2/XD22))))*(XN*YPRED(1+4)-YPRED(1+6)}-(XC11+(
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             -(EPSITH+EPSIPH) + (X] + XF2EL] + X2 + XF2EL2) - YPRED([+7) +
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              -YPRED[1+2)/S-YANTH#TAN/S+XNSQ#YAMTH/(S##2#CS##2)
                                                                                                                                                                                                                                                                                                                                                                                                                                  = YPRED(1+2)-YPRED(1+1)+(X1*SAVY(3)+X2*SAVY(6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   +K*XMTPH)-(xK21/(S*CS))*(XN*YPRED(1+4)+YPRED(
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  = (1.0/(S*CS))*(XN*YPRED(1+4)+CS*YPRED(I+5)-SN*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               +X3+(OMEGA*(ABNE*YPRED(I+5)+ATWB*YPRED(I+7)))
                                                                                                                                                                                                                                                                                                                                                                                                     (I) *SN/XK33+SN*YABPH*(XI*SAVY(3)+X2*SAVY(6)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                YPRED(I+4)+YPRED(I+5)*CS-YPRED(I+6)*SN)/(S*CS))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              -X3 # BMEGA # (AZER B # YPRED (I+5) + ABNE # YPRED (I+7))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   +YPRED(1)/XK33+YA@PH*(X1#SAVY(3)+X2#SAVY(6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  -X3*BMEGA+(AZERB+YPRED(I+4)-ABNE+YABPH+IN/S*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             = YDØT(I+5)+YPRED(I+7)*(X1*SAVY(3)+X2*SAVY(6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               X2#5AVY(6))-YABPH#(X1#5AVY(1)+X2#5AVY(4)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               = XN*YPRED(1+6)*X1CS/S-YPRED(1+4)*TAN/S
                                                                                                                                                                                                                                                                                                                                                                                                                                                                 -YPRED(1+7)+(X1+SAVY(2)+X2+SAVY(5))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              -XN**2*YPRED(1+6))+YPRED(1+7)/S)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  (ABNE *YPRED(1+4)-ATWB *YABPH))
                                                                                                                                                                                                                                                                    SN-XNSQ*YPRED(I+6))+YPRED(I+7)/S)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 = YPRED(I)+YAMPT*TAN/S
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XK12*XK21+(1.6/(
                                                                                                                                K*XMTPH)+(XC11/
                               [1+6) )+YPRED (1+7) /S
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      +X2*SAVY(6)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 -ATWOOYABPH))
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                                                                                                                                               I+4)-YPRED(I+6))+(X011-X012*XK22*X021/(XC22**2+XK22*XD22)
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   -ypreD(1+1)+(X1*SAVY(3)+X2*SAVY(6))+(1.0/(XK22+XC22**2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            (X1*SAVY(3)+X2*SAVY(6))-YABPH*(X1*SAVY(1)+X2*SAVY(4)))
                                                                                                                          X1RB+X012*XK21*X1RB*(XC22/(XC22**2+XK22*X022)))*(XN*YPRED
                                                                                                                                                                                                                     YAMPT=(-1.0/({R0/X033)+(X1R0/XK33)))+(-2.0*XN*YPRED(1+7)+XN*X1R0*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       YD81(1+1) = -{XG22/(XG22**2+XK22*XD22))*(YPRED(1+1)+K*XNTPH-XK21*
                                            = -XD12*(XC22/(XC22**2+XK22*XD22))*(YPRED(1+1)*K*XNTPH)
-K*XMTTH+XD12*(XK22/(XC22**2+XK22*XD22))*(YPRED(1+3)+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     XN&YPRED(I+4)-YPRED(I+6)))+(XK22/(XC22**2+XK22*XD22))*(
YPRED(I+3)+K*XMTPH)=(XK22*XD21/(XC22**2+XK22*XD22))*(
XK12+XC22+XD21/XD22)+(1.0/(XK22+XC22++2/XD22)))+(X1RB++2+(
                                                                                                                                                                                                                                                                                                                                                                                                                     = XN*YANTH*XIRG-XN*YAMTH*XIRGSQ-K*(XFTHLD+XMPHLD*XIRG)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               -(YD@T(I+4)*(X1*XFPHL1+X2*XFPHL2)+YA@PH#(X1*XF2EL1+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              YDBT(1+5)+YPRED(1+7)*(X]*SAVY(3)+X2*SAVY(6))
-XN*XIRB*YPRED(1)-XN*YAMPT*XIRBSQ-K*XFPHLD-(EPSITH+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          /XD22)) * (YPRED(I+1)+K*XNTPH+(XC22/XD22)* (YPRED(I+3)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 -x3+BMEGA+(AZERB+YPRED(I+6)-XN/RB+(ABNE+YPRED(I+4)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        [1+6]}-[XC22*XD21/XD22)*(X1RØSQ*(XN*(YPRED(1+4)-XN*YPRE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     YPRED(1+7)*(X)*XFPHL1+X2*XFPHL2)-X1R0*XN*(YANPT*
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                                                                                                                                                                                                                                              YPRED(I+5)+YPRED(I)/XK33+YABPH+(XI+SAVY(3)+X2+
                                                                                                                                                                                                                                                                                                                                                                       YUST (4+4)=XN*YPRED(1+5)*X1R8+YPRED(1)/XK33+YAMPT*X1R8/XK33
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                                                                                                                                                                                                                                                                                               = YPRED(I+2)-YPRED(I+1)*(XI*SAVY(3)+X2*SAVY(6))
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                                                                                                                                                                      ) * (X1RBSD * (XN * YPRED (1+4) - XNSQ * YPRED (1+6)))
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                                                                                                                                                                                                                                                                                                                  -- YPRED( I+7) + (X1 + SAVY (2) + X2 + SAVY (5))
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                       XN*YPRED(1+4)-XNSC*YPRED(1+6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           (X1 + SAVY.(3) + X2 + SAVY (6)))
                                                                                                                                                                                                                                                                                                                                                = YPRED(I)+YAMPT#XIRB
                                                                                                 K*XMTPH)+(XC11+
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         !((XK33*XD33-XC16**2)*X1R8*(-2.0*XN*YPRED(1+7)*YPRED(1*4)*
CS*X1R1-CN1R0)*XN*YPRED(1+5)*(X1R1*SN1R0)+2.0*XN*YPRED
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               GØ TØ (7341,7342,7343),IGEØM
THE FØLLØWING EQUATIØNS ARE THE -RWAF- SET
EQUATIØNS FØR SHELLS ØF REVØLUTIØN ( PHI CØØRDINATE )
YANTH = (YPRED(I+1)+K*XNTPH)*(XCI5*XC22+XD22*XK12)/(XK22*XD22+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    6 XCI5+(XK12+XD22+XK22+XD12)-XK12+XD12+XC22)/(XK22+XD22+XC22+XC22)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     = (YPRED([+3)+K*XMTPH)*(XC15*XC22+XK22*XD12)/(XK22*XD22+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    R@)-XC16)))
                                                                                                                                                        COMMON STORY(16), XMAT(110, 10), STD(10), SADUS(30), RADUS(30)
COMMON TADUS(30), UADUS(3C), SAVTIC(900)
COMMON XN, TEFREE, TIC, PHI, STOP, RESTOP, RTICK, G1, XNL(3), NH
COMMON NST(30), NKL(30), NXMAT(20), SAVJTC(30), SAVSTP(30), ARTIC(30)
COMMON UST(30), NREG, NPPT, NRC, NSC, NIX, JERROR, KGEOM, ISTTAB
                                                                                                                                                                                                                                                                                  CØMMØN JRSTØP(30),NREG,NMPT,NRC,NSC,NIX,IERRØR,KGEØM,IGEØM,ISTTAB
CØMMØN KELVIN,IBEGIN,NPRØB,NSEG,NERRØR,Q,THICK,NØJS,NLINKS,NLCASE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       4 XD2211/(XC22*XC22+XK22*XD22))+X1RØ*(XN*YPRED(1+4)+YPRED(1+5)*CS-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           [1+6)*CS*X1R0)+YA0PH*SN*(X1*SAVY(3)+X2*SAVY(6))+YPRED(1)*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XKII, XKIZ, XKZI, XKZZ, XK33,XDII,
M.I, SITIN, SITOUT, SIPIN, SIPOUT, TPTIN, IPTOUT,
ZBRIN, ZBROUT, SCRIPA, SCRIPI, SIFIN, SIFOUT, TZEPH, TZETH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           YPREU(I+6)*SN)*(XK11+(XC15*(XC15*XK22-2.0*XK12*XC22)-XK12*XK12*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     5 YPRE0(1+6)*SN)*(XC11+(XC12*XC22*XK12-XC15*(XC15*XC22+XD12*XK22+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      = RI*(YPRED(I+4)*CS*XIRB+YABPH*(XI*SAVY(3)+XZ*SAVY(6))
                                                                                                                                                                                                                                                                                                                                                                                                               YANTH, YAMTH, YAMPT, YANPT, YABPH, YADPH, YAQTH, YAJPH,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           KIRI, XIR2, CSIRI, CSIR2, SNIRI, XIRI SQ, R2SQ, RØ, BESQ,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XNTTH,XNTPH,XNTTH,XNTPH,XFTHLD,XFPHLD,XFZELD,XMTHLD,XHPHLD,ETHET(2),EPHI(2),XGPT(2),ALPHTH(2),ALPHPH(2),XNUTP,XNUTP,XNUT1,XC22,XC15,XD33,XD22,XD21,XD12,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              X1R0*YPRED([+7)*CS)*(XD11-(XD12*XD12*XK22+XC15*(2.0*XC22*XD12-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XC16**2/XD33))*(YPRED(I)+YAMPT*(SN*XIRB-XC16/XD33)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               # RI#(-2.0*YPRED(I)*CSIRØ+XN*YANTH#XIRØ-XN*YAMTH*SN*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XC22**2)-K*XMTTH+(X1RØSQ*(XN*YPRED(J+4)*SN-XNSQ*YPRED(J+6))+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XC22**2)-K*XNTTH+{XK12*XC2-XK22*XC15)*(YPRED(1+3)+K*XMTPH)/
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   X022)/(XK22*X022+XC22*XC22))+(XIRØSQ*(XN*YPRED(I+4)*SN-XNSQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XIRB, XIRBSQ, XISNRB, XICSRB, CNIRB, SNIRB, CSIRB,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        COMMON /PLS/ BMEGA: INBRO, XMERD, XPRES, XMENT, AZERB, ABNE, ATMB
                                                                                                                                                                                                                                                                                                                                                                                                                                                S.SN.CS. SNSQ.CSSQ.TAN.SEC,CN.XICS,XISN.TN.
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          (xC22*XC22+XK22*XD22)+X1RØ*(XN*YPRED(1+4)+YPRED(1+5)*CS-
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                                                                                                                                                                                                                                                                                                                                                   COMMON NISKL, NZ, NBCT, LINPUT, NTRKL, NPASS, XNI, KBC, NRINGS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 YAMPT = (1.0/(XC16*SN*X1RB-XK33-SN*X1RB*(XD33*SN/(
SUBRBUTINE BDE2 (XFPHL1, XFZEL1, XFPHL2, XFZEL2)
INTEGER SAVJTC, SAVSTP, Q, THICK
INTEGER XN1, XN
DBUBLE PRECISION SAVTIC, TIC, PHI, STØP, RESTØP, RTICK
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                , XNPHI, BETTA, ZETTA, SAVY (8), XC16
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   = XN*YPRED(I+6)*XIRG-YPRED(I+4)*SNIRG
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                                                                                                                                                                                                                                                                                                                                                                              COMMON /LASTEQ/ YPRED(16), YDØT(16), YASAVE(16),
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    +XN*YPRED(I+5)*X1RØ+(1.0/(XK33-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         RØSQ, XNSQ, BETA, RI, R2, S1, R1DØT, R1SQ,
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                                                                                                                                DØUBLE PRECISION YPRED
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   -R1*((EPSITH+EPSIPH)*(X1*XFPHL1+X2*XFPHL2)-YPRED(I+7)*
                                                                                                                                                                                                                                                                                                                       YPRED(1:6))+x1R0*YPRED(1+7)*CS)*(XC22*XD12-XC15*XD22))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         -R1*X3*BMEGA*(AZERB*YPRED(1*6)-XN/R2*(ABNE*YPRED(1*4)-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 = ( (XC16*TAN/S-XK33-(TAN/S)* (XD33*TAN/S-XC16))**(-1))* ( (XK33*XC16**2)* (1.0/(S*CS))* (-2.0*XN**PRED(1+7)-YPRED(1+4)*
SN/S+XN*YPRED(1+5)*TAN/S+2.0*XN*YPRED(1+6)/S)+YABPH*SN*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 = (YPRED([+3)+K*XMTPH)*(XC15*XC22+XK22*XD12)/(XK22*XD22+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             *(XN*YPRED(1+4)+YPRED(1+5)*CS-YPRED(1+6)*SN)*(XK12*XC22-XK22*XC15)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = (YPRED(I+1)+K*XNTPH)*(XC15*XC22+XD22*XK12)/(XK22*XD22+
                                                                                                                                                                                                                     (XO22*(YPRED(I+1)+K*XNTPH)+XC22*(YPRED(I+3)+K*XMTPH)-
XIROSQ-YAMPT*CSIRØ*(XIR1-SNIRØ))-R1*K*(XFTHLD+XMPHLD*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                XC22**2)+(YPRED(I+1)+K*XNTPH)*(XD22*XC15-XD12*XC22)/(XD22*XK22+
                                                                                                                                                                                       VPRED(1+6)-R1#YPRED(1+7)#(X1#SAVY(3)+X2#SAVY(6))+R1#
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           2-(X1RØSG*(XN*YPRED(1+4)*SN-XNSG*YPRED(1+6))+X1RB*YPRED(1+7)*CS)*
3(XC15*XC22+XK22*XD12))/(XC22**2+XK22*XD22)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            YPRED(1+6)*SN)*(XC11+(XD12*XC22*XK12-XC15*(XC15*XC22+XD12*XK22+
                                                      (X1*XFZEL1+X2*XFZEL2))-R1*SN1RB*(YABPH*(X1*SAVY(1)+
                                                                                                                                                                                                                                                                                                                                                                                                                   = XIR1*(YDØT(1+5)-YPRED(1+6))+YPRED(1+7)*(X1*SAVY(3)+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          XFZEL1+X2*XFZEL2)+YPRED(I+7)*(X1*XFPHL1+X2*XFPHL2))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      RI#(YAMTH*CS1RØ-YPRED(I+3)*CS1RØ-2.0*XN*YAMPT*X1RØ+
                                                                                                                                                                                                                                                                                     [XK12*XD22+XC15*XC22]-(XIR8SQ*(XN*YPRED([+4)-XNSQ*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 YAMPI*(SN*X1RØ+X1R1))+YPRED(I+2)*X1R1)-R1*K*XFPHLD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    XC22**2)-K*XNTTH+(XK12*XC22-XK22*XC15)*(YPRED(1+3)+K*XMTPH)/
(XC22*XC22+XK22*XD22)+(XN*YPRED(1+4)+YPRED(1+5)*CS-YPRED(1+6)
                                                                                                                                                                                                                                           XIR@*(XN*YPRED(I+4)+YPRED(I+5)*CS-YPRED(I+6)*SN)*
                           SNIR8)-(YD8T(I+4)*(X1*XFPHL1+X2*XFPHL2)+R1*YA8PH*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              RI*(-YPRED(I+2)*CSIRB-YANTH*SNIRB-YPRED(I+1)*XIR1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        -R1*X1RB*XN*(YANP1*(X1*SAVY(3)+X2*SAVY(6))-YABPH*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                R1*(XK22*(YPRED(I+3)+K*XMTPH)-XC22*(YPRED(I+1)+K*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    +SN)/(S*CS)*(XK11+(XC15*(XC15*XK22-2.0*XK12*XC22)-XK12*XK12*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    YPRED(1+6))/(S*S*CSSQ)+YPRED(1+7)/S)*(-XC11+(XC15*XC15*XC22+
                                                                                                                       -R1 *X3 * BMEGA * ( AZERO * YPRED ( I + 4 ) - ABNE * YA BP H+ SN / RD *
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             +XNSQ+YAMTH*X1R0SQ-2.0+XN*YAMPT*CS+X1R0SQ1+R1+K*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           (XN*XMPHLO*X1R0~XFZELD)-R1+((EPSITH+EPSIPH)+(X1*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      +R1 * X3 * (BMEGA * (ABNE * YPRED (I+5) + ATWB * YPRED (I+7)))
                                                                                                                                                                                                                                                                                                                                                                                    XIRB*(XN*YPRED(I+4)+YPRED(I+5)*CS-YPRED(I+6)*SN)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      RI*(CSIRB*(YANTH-YPRED(I+1))-XN*XIRB*(YPRED(I)+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      (X1*SAVY(3)+X2*SAVY(6))+YPRED(1)*(XD33*TAN/S-XC16))
= YPRED(1+2)-YPRED(1+1)*(X1*SAVY(3)+X2*SAVY(6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                -R1*X3*PMEGA*(AZER@*YPRED([+5]+ABNE*YPRED([+7])
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XD22))/(XC22*XC22+XK22*XD22))+1.0/(S*CS)*(XN*YPRED(I+4)+
                                                                                           X2#SAVY(4))-YANPT#(X1#SAVY(3)+X2#SAVY(6)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      XD22)/(xK22*XD22+XC22*XC22))+((xN+YPRED(I+4)*SN-XNSQ*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = XN#YPRED([+6)*X1CS/S-YPRED(1+4)*TAN/S
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    RI*(YPRED(1+7)-YPRED(1+5)*X1R1)
                                                                                                                                                           (ABNE#YPRED(I+4)-ATW@#YA@PH))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          (X1#SAVY(1)+X2#SAVY(4)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          6 XD22*XK12))/(XC22*XC22+XK22*XD22))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 (X1 * XFZEL 1 + X2 + XFZEL 2))
                                                                                                                                                                                                                                                                                                                                                         /(XK22*xD22+XC22**2)
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ATWO * YARPH))
                                                                                                                                                                                                                                                                                                                                                                                                                                                       X2#SAVY(6))
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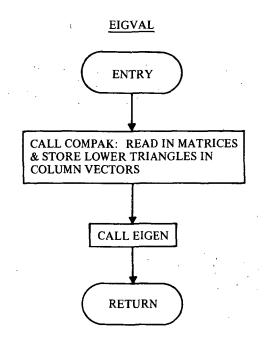
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                                                                                                2.0*YPRED(1)/5+XN*YANTH*X1CS/S-XN*YAMTH*SN*X1CS**2/S**2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         = (YPRED(I+3)+K*XHTPH)*(XC15*XC22+XK22*XD12)/(XK22*XD22+
                                                                                                                                                                                              TAN/S*(YABPH*(X1*SAVY(1)+X2*SAVY(4))-YANPT*(X1*SAVY(3)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  = (YPRED(1+1)+K*XNTPH)*(XC15*XC22+XD22*XK12)/(XK22*XD22+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             6 XC15*(XK12*XD22+XK22*XD12)-XK12*XD12*XC22)/(XK22*XD22+XC22+XC22+XC22))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    -X3*BMEGA*(AZERB*YPRED(I+6)-XN/(S*CS)*(ABNE*YPRED(I+4)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            YAMPT=(1/(XC16*X1R0-XK33-X1R0+(XD33*X1R2-XC16)))+((XK33*XD33-XC16
                                                                                                                                                                                                                                                                                                                             = -YPRED(I+7)*(X1*SAVY(3)+X2*SAVY(6))+(XD22*(YPRED(I+1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     VDRT(1+7) = (XK22*(VPRED(1+3)+K*XMTPH)-XC22*(VPRED(1+1)+K*XNTPH)+
                                                                                                                                                                                                                                                                                                                                                                                            XD22+XC15+XC22)+(1.0/(S*CS)+(XN*YPRED(1+4)+YPRED(1+5)+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      YAMTH/S-YPRED(1+3)/S-2.0*XN*YAMPT/(S*CS)+YAJPH+XMTHLD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XC22*#2)+(YPRED(I+1)+K*XNIPH)*(XD22*XC15-XD12*XC22)/(XD22*XK22+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     **2)*X1RØ*(-2.0*XN*YPRED(I+7)*XN*XIRØ*YPRED(I+5))+YAØPH*
(X1*SAVY(3)+X2*SAVY(6))+YPRED(I)*(XD33*XIRØ-XC16))
                                                                                                                                                                                                                                                                                                                                                                                                                                                          YPRED(1+6)+XN*YPRED(1+4)*SN)/(S*S*CSSQ)+YPRED(1+71/S)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         -YPRED(I+1)/S+YANTH/S-XN*YPRED(I)/(S+CS)-XN*YAMPT+SN/
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           (S**2*CS**2)-K*XFPHLD-(EPSITH+EPSIPH)*(X1*XFPHL1+X2*
                                                                                                                               +YAMPT*TAN/S**2-K*(XFTHLD+XMPHLD*TAN/S)-(YDBT(I+4)*
                                                                                                                                                              (X1*XFPHL1+X2*XFPHL2)+YABPH*(X1*XFZEL1+X2*XFZEL2))-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        -2.0*XN*YAMP1/(S**2*CS)+K*(XN*XMPHLD*X1CS/S-XFZELD)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   (X1 * XFP HL 1 + X2 * XFP HL 2 ) - X1CS / S * XN * (YANPT * (X1 * SAVY (3) +
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       EPSITH+EPSIPH)+(X1*XFZEL1+X2*XFZEL2)-YPRED(I+7)*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    YPRED(1+5)*CS-YPRED(1+6)*SN))-(XC15*XC22+XK22*XD12)*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        -YPRED(1+2)/S-YANTH*TAN/S+XNSQ*YAMTH/(S**2*CS**2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          YPRED([+6))*(XK11+(XC15*(XC15*XK22-2.0*XK12*XC22)-XK12*XK12*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           YPRED(I+6))*(XC11+(XD12*XC22*XK12-XC15*(XC15*XC22+XD12*XK22+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XC22*#2)-K#XNTTH+(XK12*XC22-XK22*XC15)#(YPRED(1+3)+K#XMTPH)/
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    (XK12*XC22-XK22*XC15)*(1.0/(S*CS)*(XN*YPRED(1+4)+
                                                                                                                                                                                                                                                                                                                                                                                                                              CS-YPRED(1+6)*SN))-(XC22*XD12-XC15*XD22)*((-XNSQ*
DOT(1+4) = YPRED(1+4)/S+YABPH*(X1*SAVY(3)+X2*SAVY(6))+XN*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                ((-XNSQ*YPRED(I+6)+XN*YPRED(I+4)*SN)/(S*S*CSSQ)+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    +X3 * (BMEGA * (ABNE * YPRED (I+5) + ATWB * YPRED (I+7)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XD22)/(XK22*XD22+XC22*XC22))+(X1RBSQ*(XN*YPRED(1+4)-XNSQ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        = (1.0/(S*CS))*(XN*YPRED(I+4)+CS*YPRED(I+5)-SN*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         YPRED(I+2)-YPRED(I+1)*(X1*SAVY(3)+X2*SAVY(6))
                                                                                                                                                                                                                                                            -X3*BMEGA*(AZERB*YPRED(I+4)-ABNE*YABPH+TN/S*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      -X3*BMEGA*(AZERB*YPRED(I+5)+ABNE*YPRED(I+7))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XC22**2)-K*XMTTH+X1RBSQ*(XN*YPRED(1+4)-XNSQ*YPRED(1+6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             YD@T([+5]+YPRED([+7]*(X]*SAVY(3)+X2*SAVY(6))
                                                                 XD33))*(YPRED(1)+YAMPT*(TAN/S-XC16/XD33))
                                                                                                                                                                                                                                                                                                                                                            +K*XNTPH)+XC22*(YPRED(I+3)+K*XMTPH)-(XKL2*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     (2#SAVY(6))-YABPH*(X1#SAVY(1)+X2#SAVY(4)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          KFPHL2)+YPRED(1+7)*(X1*XFZEL1+X2*XFZEL2)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            XD22))/(XC22*XC22+XK22*XD22))+X1RØ*(XN*YPRED(I+4)-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             -#(XD11-(XD12*XD12*XK22+XC15*(2.0*XC22*XD12-XC15*
                                  YPRED(1+5)/(S#CS)+(1.0/(XK33-XC16*#2/
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  YPRED(1+7)/S))/(XK22*XD22+XC22*XC22)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              XC22#XC22+XK22#XD22)+X1R@#(XN#YPRED(I+4)-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             = XIRB*(XN*YPRED(I+6)-YPRED(I+4))
                                                                                                                                                                                                                                                                                              (ABNE*YPRED(1+4)-ATMØ*YABPH))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              *YPRED(1+6)))*(-XC11+(XC15*XC15*XC22+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           XD22*XK121)/(XC22*XC22+XK22*XD221)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               /(XK22*XD22+XC22*XC22)
                                                                                                                                                                                                                                +X2*SAVY(6)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      -ATMO*YAOPH)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              YPRED(I+6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                EQUATIONS FOR CYLINDER
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      YDØT([+6)=YPRED([+7)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  (DØT(1+3)=
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            YDØT(I+1)=
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     YD@T(1+2)
                                                                                                                                                                                                                                                                                                                             YDØT(1+5)
                                                                                             rogr(1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  7343 YANTH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        EPS1.TH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      EPSIPH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         YAJPH
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                                                                                                                                                                                                       X2+XFZEL2))-X1R0+(YABPH+(X1+SAVY(1)+X2+SAVY(4))-YANPT+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                (XI+SAVY(3)+X2+SAVY(6))-YABPH+(XI+SAVY(1)+X2+SAVY(4)))
                                                                                                                                                                                                                                                                                                                                                                                 |(XN*YPRED||144)-YPRED||146|)*(XK||2*XC22-XK22*XC||5)-XIR @SG*(XN*YPRED
||144)-XNSG*YPRED||146|)*(XC||5*XC22+XK22*XD||2)||XC22**2+XK22*XD||2)
                                                                                                                                                                                                                                                                                                                     -YPRED(I+7)*(X1*SAVY(3)+X2*SAVY(6))+(XD22*(YPRED(I+1)
                                                                                                                                                                                                                                                                                                                                                                                                            2(1+4)-XNSQ*YPRED([+6))*(XC22*XD12-XC15*XD22))/(XK22*XD22+XC22**2)
                                                                                                                                              = XN*YANTH*X1RB-XN*YAMTH*X1RBSQ-K*(XFTHLD+XMPHLD*X1RB)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          EPSIPH) + (X1 *XFPHL1+X2*XFPHL2)+YPRED([+7) * (X1*XF2EL]+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       YDØT([+7] = (XK22*(YPRED([+3)+K*XMTPH)-XC22*(YPRED([+1)+K*XNTPH)
                                                                                                                                                                         -(YDØT(1+4)*(X1*XFPHL1+X2*XFPHL2)+YAØPH*(X1*XF2EL1+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 /DØI(I+1) = -xn*x1RØ*YPRED(I)-xn*YAMPT*X1RØSG-K*XFPHLD-(EPSITH+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            -x3*@MEGA*(A2ER@*YPRED(I+6)-xn/R@*(A0NE*YPRED(I+4)
                                                            = (YABPH*(XI*SAVY(3)+X2*SAVY(6))+XN*YPRED(I+5)/RB)+
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     /PRED(I+7) + (XI * XFPHL I+X2 + XFPHL2) - XIRB + XN + (YANPT +
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              -YANTH#X1R@+XNSQ#YAMTH#X1RBSQ+K#(XN#XMPHLD#X1RB-
                                                                                                                                                                                                                                                        -x3*BMEGA*(AZERB*YPRED(I+4)-ABNE*YABPH+1.0/RB*
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       XFZELD)-(EPSITH+EPSIPH)*(X1*XFZEL1+X2*XFZEL2)-
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              +X3+(BMEGA+(ABNE+YPRED(I+5)+ATWB+YPRED(I+7)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      YDØT(I+5)+YPRED(I+7)*(X1*SAVY(3)+X2*SAVY(6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   -X3#BMEGA*(AZERB*YPRED(I+5)+ABNE*YPRED(I+7))
                                                                                                                                                                                                                                                                                                                                                     +K*XNTPH)+XC22*(YPRED(I+3)+K*XMTPH)-X1RB*
                                                                                       11.0/(XK33-XC16**2/XD33))*(YPRED(1)+
-YPRED( 1+7)*(X1*SAVY(2)+X2*SAVY(5))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     YDØT(I+3) = -2.0*XN*YAMPI*XIR@+YAJPH+K*XMTHLD
                                                                                                                                                                                                                                                                                                                                                                                                                                          = XIRG*(XN*YPRED(I+4)-YPRED(I+6)
                                                                                                                                                                                                                                                                                               (ABNE *YPRED ( I+4 ) - ATWB *Y ABPH))
                                                                                                                                                                                                                                     (X1 # SAVY (3) + X2 # SAVY (6) ) )
                                                                                                                  YAMPT * (X1RØ-XC16/XD33))
                                = YPRED(I)+YAMPT*X1RB
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          -ATME *YABPH)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        (2*XFZEL2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              YASAVE(IY+7) = YAJPH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            YDØT(1+6)=YPRED(1+7)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             YASAVE(IY) = YANTH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 YASAVE(IY+1)=YAMTH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   YASAVE(IY+4)=YABPH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            YASAVE(IY+2)=YAMPT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        YASAVE (IY+3)=YANPT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     IY =8*(M-1)+1
                                                                                                                                                                                                                                                                                                                       YDØT(1+5) =
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              vD@T([+2) =
                                                            YD@T(1+4)
                                                                                                                                              YDØT(I)
                                                                                                                                                                                                                                                                                                                                                                                                                                          EPSITH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      PSIPH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          RETURN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       9005
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SUBROUTINE EIGVAL

This is the controlling routine for the program eigenvalue calculation loop. The necessary matrices for the calculations are passed to COMPAK, and thence to routine EIGEN. The controlling routine EIGVAL will provide intermediate matrix print as desired.

Subroutine COMPAK: This routine reads rows of a two-dimensional array from a storage unit into core and then stores them into a column vector.



| Z Z | 3400020 | |
|---|---------|--|
| NCHK = 0 PGW = I.C | | |
| REWIND 4 | 3400030 | |
| | 3400040 | |
| COMPAK | 3400050 | |
| CALL COMPAK (11,N,B) | 3400060 | |
| | 3400070 | |
| 9 | 0800046 | |
| ~ | 3400100 | |
| FORMAT(IHI, 53X, - DYNAMIC STIFFNESS MATRIX-/) | 3400110 | |
| 9 | 3400120 | |
| | 3400130 | |
| #K E 6+22 J+(A()+ =M+K | 3400140 | |
| アダアエス・コンティア ロロコン・ラン・フィッコー フェー・コンティン ロー・コンティン コー・スキー | 3400360 | |
| Ħ | 3400170 | |
| | 3400180 | |
| • | 3400190 | |
| 69 (m) | 3400200 | |
| T U T+1-1 | 3400210 | |
| | 0400046 | |
| - 50 | 3400240 | |
| DØ 10 J≈1, INDEX | 3400250 | |
| ŝ | 3400260 | |
| E. | | |
| RAT # 0.0 | | |
| - 5 | | |
| 2 1 | | |
| Ę | | |
| IF (RATI.GT.RAT) RAT = RATI | | |
| K+1 | | |
| | | |
| DØ 60 J=1,1NDEX | | |
| E(J) = B(J)+ALAMDA*A(J) | | |
| CONTINUE CALL EIGEN IN.A.B.CONV.D.FIG.DVEC.NPAS.NCHK.ALAMDA.PGEL | 3400270 | |
| IF (NCHK.NE.0) GB TB 1 | 3400271 | |
| KETURN | 3400300 | |
| | | |

C(M) = X(20 M = M+1 1c CONTINUE RETURN END

156

. **T**)

SUBROUTINE EIGEN

EIGEN is the main eigenvalue and eigenvector calculation routine. Printout of the eigenvalues and appropriate eigenvectors is provided by this routine. First EIGEN prepares the matrices for eigenvalue extraction, calling FUTILE, DAGGER, and SWITCH. Then the matrices are passed to SYMEIG, which obtains the eigenvalues and specified vectors using the Householder technique.

Subroutine DAGGER: This routine performs the reduction of the two matrix eigenvalue problem to a standard eigenvalue problem.

Subroutine SYMEIG (Alternate entry point SYMVEC): This routine obtains the eigenvalues and vectors of a real, symmetric, matrix.

Subroutine TFORM: This routine performs the Householder similarity reduction of a real, symmetric matrix to tri-diagonal form.

Subroutine STURM: Performs the Sturm-sequence calculations of eigenvalues of a real, symmetric, tri-diagonal matrix.

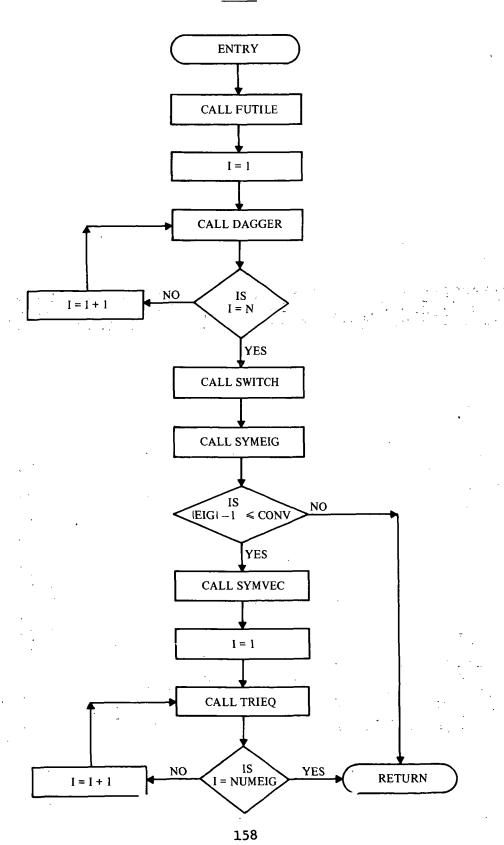
Subroutine PREP (alternate entry point DET): Determines the number of roots greater or equal to a stipulated value.

Subroutine QSVEC (alternate entry point QWIEL): Obtains eigenvectors of a tri-diagonal matrix and back transforms them to eigenvectors of the original real, symmetric matrix.

Subroutine RANDOM: Random number generator. This subroutine is an MSFC system subroutine and the listing is not included here. Most any random number generator may be substituted or the argument may be set to zero.

Subroutine ANDD: This routine "ands" or "ors" the corresponding bits of two given variables with each other.

Subroutine DOTPRO: Performs inner product accumulation using labeled common area INFO.



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                                                                                                                                                                                                                                                                                             3600190
FØR, IS EIGEN, EIGEN
Subrøutine eigen (n, a, B, cønv, q, eig, qvec, npas, nchk, alamda, pøw)
                                                                          DIMENSIBN A(1),Q(1),B(1)
DIMENSIBN C(128),QVEC(128,1)
CØMMØN /ARING/ NRING(28),AMAT(30,4),ISTART,NUMVEC,MSEIG
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   A FORM SUITABLE FOR SYMEIG
THE CHOLESKY MATRIX
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          FORM A-MATRIX COLUMN INVERSES, - STORE IN G
                                                                                                                                                                                                                                                                                                       FORM CHOLESKY DECOMPOSITION OF B MATRIX
                                                                                                                                                                                                                                                                                                                                                                                 41 FORMAT(- B IS NOT POSITIVE DEFINITE-)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             CALL SYMEIG(A,N,I,NUMEIG,Q,TBL)
                                                                                                                                                                                                                                                                                                                                                                                                                4 WRITE(6,42)
42 FORMAT(- BVERFLØW IN FUTILE-)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        20 Q(J)=Q(J)/X
10 CALL DAGGER(A+N+Q+I+A(INDEX))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   STØRE (L)(A)(L-TRANSPØSE) IN WHERE L IS THE INVERSE OF
                                             (A)(X)=(LAMBDA)(B)(X)
                                                                                                                                                                                                                                                                                                                                    CALL FUTILE (B,N,NIX)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           WRITE(4) (Q(J), J=1, 1)
                                                                                                                        /WINTER/INDIC8
                                                                                                                                                                                                                                                                                                                                                                                                                                                              L-MATRIX STØRED IN B
                                                                                                                                                                                                                                             INDEX=(N*N+N)/2+1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       ANS = C(3)/ALAMDA
                                                                                                                                       COMMON /BOND/M,L
REWIND 4
                                                                                                                                                                                                                                                           INDEX1=INDEX-1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 30 1 J=10FF, J2
                                                                                                                                                                                                                                                                                                                                                     IF (NIX) 2, 3, 4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    08 10 I=1,N
J2 = 18FF+I-1
                                                                                                                                                                                                                  10L = 0.1E-7
                                                                                                                                                                                                                                                                                                                                                                     WRITE(6,41)
                                                                                                                                                                                                                                 NUMEIG = N
                                                                                                                                                                     INDIC8=-1
                                                                                                                                                                                                                                                                             O = XIN
                                                                                                                        COMMON
                                                                                                                                                                                                                                                                                                                                                                                                    RETURN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       3 10FF=1
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           IF (NUMVEC.EQ.1) WRITE(6,610) ISTART
610 FØRMAT(//5x,-THE REQUIRED EIGENVALUE IS NUMBER-,13)
600 EIG = C(ISTART)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  IF (ABS(ABS(EIG)-1.C).GT.CBNV) GB TB 99
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 501 IF ((1.0-C(J-1)).LT.(C(J)-1.0)) J = J-1
500 ISTART = J
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               WRITE(6,57)1,(Q(1J),1J=1,N)
57 FØRMAT(//- EIGENVECTØR-,14/(1P8E15.6))
                                                                                 WRITE(6,56) (C(1), I=1,NUMEIG)
56 FBRMAT(///- EIGENVALUES-/(IPREI5.6))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         WRITE(4) (A(IND), IND=INDEX, IN)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               IF (J.EQ.NUMEIG) ISTART = J-1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              CALL SYMVEC (A(INDEX), I, I, N)
                                                                                                                                                                                                                                                                                                                                                                                 GB TB 50C
IF (C(NN).LT.1.0) GB TB 411
IF (ANS.GE.1.E-6) GB TB 301
                                                                                                                                                                                                                                                         IF (NUMVEC.EQ.0) G0 T0 5C0
D0 400 J=MM,NUMEIG
IF (C(J).LT.0.0) G0 T0 401
                                                                                                                                                                                    MM = 2
IF (MSEIG.EQ.O) G0 T0 310
                                                                                                                                                                                                                                                                                                                                                                                                                              GØ TØ 50C
DØ 402 J=MM,L
IF (C(J)-1.0) 402,500,501
                                                                                                                                                       IF (NPAS.GT.1) GB TE 600
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            READ(4) (A(J),J=IBFF,J2)
IBFF=IBFF+I
                                                                                                                                                                                                                                                                                                                                                         IF (L.GT.NN) GB TB 410
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      READ(4) (Q(J),J=1,N)
CALL TRIEQ (A,Q)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                DØ 30 I=ISTART, IVEC
                                                                                                                           EIGENVALUES ARE IN Q
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           70 QVEC(13,1) = Q(13)
                           POW = ANS/1.E-6
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       IVEC = ISTART+1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           IN=INDEX1+N
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 DØ 40 I=1.N
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              J2=18FF+1-1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1=:1,2
                                                                                                                                                                                                                                                                                                                L = NUMEIG
                                                                                                                                                                                                                                                                                                                               GØ TØ 41C
                                                      CONTINUE
NCHK = 0
                                                                                                                                                                                                                                                                                                   CONTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                      402 CØNTINUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        CONTINUE
              NCHK = 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     REWIND 4
                                                                                                                                                                                                                                                                                                                                              - n
                                                                                                                                                                                                                                                                                                                                                                                                                NN = T
                                                                                                                                                                                                                                              310 NN = J
                                                                                                                                                                                                                                                                                                                                                                        ب
                                                                                                                                                                                                                 5 = 0
                                                                                                                                                                                                                                                                                                                                                                                                    410
                                                                                                                                                                                                                                                                                                   400
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          9
                                                       301
                                                                                                                                                                                                                                                                                                                                             401
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,161

```
FOR, IS DAGGER, DAGGER

SUBROUTINE DAGGER(A,M,P,KO,Q)

DIMENSIBN A(11),P(11),Q(11)

EQUIVALENCE (SUN,SUM)

K = KQ

K1 = K + 1

L= 1

L= K + 1

L= 1

L= 100

DB 130 I = 2,KI

L3 = 1NDEX

SUM = 0.0

DB 90 J = 1,L

SUM = SUM + A(LJ)*P(J)

90 LJ = LJ + 1

10 LJ = LJ + 1

10 LJ = LL + L

UB 110 J = 1,K

SUM = SUM + A(LJ)*P(J)

110 LJ = LJ + J

110 LJ = LJ + J

110 LJ = LL + L

UB 110 J = 1,K

SUM = SUM + P(I)*Q(I)

110 LJ = LJ + J

110 LJ = LJ + J

110 LJ = LJ + J

120 QI - I) = SUM

100 L = I

SUM = SUM + P(I)*Q(I)

140 L = I

SUM = SUM + P(I)*Q(I)

140 L = LL + I

LL + LL + L

SUM = 0.0

DB 190 L = KI,M

SUM = 0.0

DB 180 J = 1,K

SUM = 0.0

DB 180 J = 1,K

SUM = SUM + P(J)*A(JL)

180 JL = LL + L

190 A(LL) = SUM

RETURN

RETURN
```

```
3800040
3800050
3800060
                                                                                                                                                                                                                                                           800140
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         1800330
                                                                                                                                                                                                                   800120
                                                                                                                                                                                                                                       3800130
                                                                                                                                                                                                                                                                              800150
                                                                                                                                                                                                                                                                                                  800160
                                                                                                                                                                                                                                                                                                                      800170
                                                                                                                                                                                                                                                                                                                                            1800180
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     3800020
                         3800030
                                                                                                         8000070
                                                                                                                               3800080
                                                                                                                                                   3800090
                                                                                                                                                                       3800100
                                                                                                                                                                                               3800110
                                                                                                                                                                     THE TRIANGULAR ARRAY CONTAINING THE MATRIX. DURING EXEC-
CUTION THE ARRAY IS CHANGED.
                                                                                                                                                                                                                                                                                                                                                          REAL ARRAY FOR THE ROOTS AND WORKING STORAGE. R MUST CONTAIN AT LEAST 8*H "WORDS AND START ON A D.P. BOUNDARY.
MASTER KØUTINE FØR EIGENVALUES AND (ØPTIØNALY) EIGENVECTØRS ØF A
REAL SYMMETRIC MATRIX STØRED TRIANGULARLY IN CØRE. THE HØUSEHØLDER
REDUCTIØN TØ TRIDIAGØNAL FØRM (SUBRØUTINE TFØRM) IS FØLLØMED BY A
BISECTIØN TECHNIQUE (SUBRØUTINE STURM) FØR THE RØØTS AND THEN IN-
                                                                                                                                                                                                                                                                                                                                                                                                                        TØLERANCE. IF B IS THE MAG. ØF LARGEST RØØT, THE RØØTS WILL USUALLY HAVE ERRØRS AS LARGE AS B*TØL.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           CALL SIURM(M, INDEX, NUMBR, R(LD), R(LB), R(LS), R(LP), R, EPS)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           QSVEC(A,R(LD),R(LB),R(LP),R(LQ),R(LR),R(LS),M)
                                                                                     VERSE ITERATION (SUBROUTINE TRIVEC) FOR THE VECTORS.
                                                                                                                                                                                                                                                                        INDEX- ØF FIRST. ELGENVALUE REQUIRED.
                                                                                                                                                                                                                                                                                                                  NUMBER OF EIGENVALUES REQUIRED.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   CALL TFORM(A,M.R(LD),R(LB),R(LS),R(LP))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     SYMVEC (X, LØW, KØUNT, MID)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  RØDT = AMINI(RØBT-EPS,R(K))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      CALL QWIEL(ROBT, X(1,1))
                                                                                                                                                   THE PARAMETERS.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = AMIN1(TØL, 1.E-3)
                                                                                                                                                                                                                                   BRDER BF A.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      DIMENSION A(1),R(1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     = RØØT # 3.E-7
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         DIMENSION X(MID.1)
                                                                                                                                                 MEANING OF
                                                                                                                                                                                                                                                                            INDEX
                                                                                                                                                                                                                                                                                                                      NUMBR
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     ROGI
                                                                                                                                                                                                                                                                                                                                                                                                                            101
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          200
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FOR, IS TERM, TERM
SUBROUTINE TFORM(A,N,D,0,S,P
UIMENSION A(1),D(1),B(1),S(1)
                                                                                                                                                                                                                                                                                                                                                                                                   150 A(KKPI) = A(KKPI) - RHØ
RHØ = 1. / (RHØ*A(KKPI)
                                                                                                                                                                                                                                                                                                                                               IF (A(KKP1)) 140,140,130
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     DØ 190 I = KP1,N
D(I) = D(I) + A(II) +Ø(I)
                                                                                                                                                                                                                                          SUM = SUM + A(KJ) *A(KJ)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                210 D(1) = D(1) + TAU*B(1
                                                                                                                                                                                                                                                                                                                                                                                      (SUM) 150,230,150
                                                                                                                                                                                                                              CØ 100 KJ = KKP1,KN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      IF (NI) 170,190,170
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          200 SUM = SUM + D(1) *B(
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            II = KIKI
NI = NK
DØ-220 I = KP1,N
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                IN'I
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        TAU = RHB + SUM
                                                                                                                                                                                                                                                                    RHØ = SQRT(SUM)
                                                                                                                                                                                                     KIKI = KN +
                                                                                                                                                                                                                                                                                                                                                              130 RHB = -RHB
                                                                                                                                                                                                                                                                                                                                                                          140 B(K) = RHB
                                                                                                                                                                                                                                                                                                                                    120 BLD = RHB
                                                                                                                                                              KKP] = KK
                                                                                                          N1 = N -
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     (I)0'=
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                SUM = 0.
                                                                                                                                                 KK = K1K
                                                                                                                                                                                                                   SUM = 0.
                                                                                                                                   KP1 = K
                                                                   PLD = 0.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              002 80
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    08 210
                                                                                             KIK1 =
                                                                                                                                                                                                                                                         S(K) =
                                                                                                                                                                                                                                                                                                                                                                                                                                A(KK)
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3900580

3900010 3900020 3900030

Q)

3900040 3900050 3900060

900150

900200

DB 220 J = 1.N

A(1) = A(1) + RHB*B(J) + TAU*D(J)

220 1J = 1J + 1

230 D(K+1) = A(K1K1)

Q(N) = A(KK1)

Q(N) = ARKNINGS(D(N)-RHB)

S(N) = AMAXI(BU,DIN)+RHB)

RETURN

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4100010
4100020
4100030
4100040
4100050
4100050
4100110
4100110
4100110
4100110
4100110
4100110
4100110
4100110
4100200
4100200
4100200
4100200
4100200
4100200
4100200
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SUBRBUTINE PREP (N.D.SEC,RØBT,LØRD) DIMENSIØN O(1),SEC(1) EQUIVALENCE (RD2,RE2),(RD4,RE4)

FOR, IS PREP, PREP

CØ TØ 200 ENTRY DET (N.D. SEC. RØØT. LØRD)

100 KD2 = 0.D0

1F (LGM - N1) 100,100,130 200 RETURN END

1 = MØT.091

... 167

```
SUBRBUTINE GSVEC(A,D,0FFD,P,Q,R,S,N)

SUBRBUTINE GSVEC(A,D,0FFD,P,Q,R,S,N)

SYMMETRIC MATRIX EIGENVECTOR CALCULATION.

GIVEN THE ENTRIES (D AND BFFD) BF THE HBUSEHBLDER TRI-DIAGONAL FORM B 4200030

GIVEN THE ENTRIES (D AND BFFD) BF THE HBUSEHBLDER TRI-DIAGONAL FORM B 4200030

GF A REAL SYMMETRIC HATRIX A AND GIVEN A GOOD APPROXIMATE ROOF FF 4200040

B (AND A) THIS FORTRAN 4 SUBRBUTINE COMPUTES A UNIT EIGENVECTOR X 4200050

BF B, THEN TRANSFORMS IT TO A UNIT VECTOR OF A, USING THE VECTORS M 4200060

STORED IN THE A ARRAY.

4200090
                                                                                                                                                                                                                                                                                                        200200
200210
200220
200230
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4200260
4200270
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    (ABS(P(N)) -LT. TOL) P(N) = TOL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                PART' 3. RIGHT SIDE MODIFICATION
                                                                                                                                                                                                                                                                                                                                                                                                                                                        = (10L + 1.E-15) + 1.E-15
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       DØ 150
T = ABS (P(I))
U = ABS (ØFFD(I))
T + U - TØL) 110,120,120
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         CALL ANDD (S(1), FLAG, S(1))
P(1+1) = P(1+1) - S(1)*Q(1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      PART 2. MATRIX DECOMPOSITION.
                                                                                                                                                       COMMON / INFO / SUM, M, IX, IA
DATA FLAG/07777777776/
                                                                                                                                                                                                                                                                                                                                                                                                             = AMAX1(TBL, ABS(D(I)))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               P(I+1) = TEMP - S(I)*Q(I)
Q(I+1) = -S(I)*R(I)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        IF (T - U) 130,140,140
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      # P(11/0FFU(1)
BRR (S(1),1,5(1))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         170 ASSIGN 330 TB KBUNT
DB 200 I = 1.NI
                                                                                                                                                                                                                                                                                                           OHIEL (RØØT,X)
                                                                                                                                                                                                   PART 1. PRELIMINARIES.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            = @FFD(I)/P(I)
                                                                                                                                                                                                                                                                                                                        ASSIGN 170 TØ KØUNI
                                                                                                                                                                                                                                                                                                                                                                   P(1) = D(1) - RBBT
Q(1) = BFFD(1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     I = 1,N1
                                                                                                                                                                                                                                                                                                                                                                                                                             CALL RANDOM (XX)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     # 0FF0(1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    = p(1+1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   0(1+1)
     FOR, IS QSVEC, QSVEC
                                                                                                                                                                                                                                                                                                                                                                                                                                           X(I) = XX+*I
                                                                                                                                                                                                                                                                                                                                                                                                  R(I) = 0.
                                                                                                                                                                                                                                                                                                                                       TOL = 0.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       150 CØNTINUE
                                                                                                                                                                                                                                                                                                                                                      100
                                                                                                                                                                                                                                                                                             RETURN
                                                                                                                                                                                                                                                                              2
                                                                                                                                                                                                                                                                                                           ENTRY
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        120
130
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4700020
4700030
4700050
4700060
4700080
4700100
4700110
4700120
4700150
4700150
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REAL NØ EQUIVALENCE (UND.E).(JA,SI).(NEIN,NØ)

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3700010
3700020
3700030
3700040
3700060
3700060
3700090
3700100
3700110
```

FØR, IS DØTPRØ, DØTPRØ (x,y)
DIMENSION X(1), Y(1)
DIMENSION X(1), Y(1)
DØUBLE PRECISION S
CØMMØN / INFØ/ S,N,IX,IY
IF (N) 120,120,100
JX = 1
DØ 110 J = 1,N
S = S + X(JX)*Y(JY)
JX = JX + IX
IIO JY = JX + IX
IIO JY = JY + IY
IZO RETURN
FND

SUBROUTINE DETERM

This is the controlling routine for the program determinant evaluation loop. The matrix in question is passed to DET2 where the determinant evaluation calculations occur.

Subroutine DET2: This routine computes the determinant of a square matrix. The actual determinant value is normalized to ± 1 .

Subroutine DCOMP2: This routine performs the triangular factorization of a square matrix.

Subroutine SUPER: This routine performs inner product accumulation.

CALL DET 2

CALL SUPER TO ACCUMULATE THE INNER PRODUCT

```
FOR, IS DETERM, DETERM
SUBRBUTINE DETERM (NZ, MDET)
DIMENSION A (128, 128), T(256)
REWIND 4
DØ 187 1=1,NZ
187 READ(4) (A(1,J), J=1,NZ)
CALL DETZ (A,NZ, 128, T,NU,D)
WITE(6,80) D
80 FORMAT(///20X,-DETERMINANT =-,F5.1)
REMIND 4
RETURN
END
```

¹ 174

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4900010
4900020
4900030
4900050
4900050
4900070
4900090
4900110
4900110
6900130
                                                                                                                                                                                                 4900160
4900170
4900180
                                                                                                                                                                                                                                                 4900200
4900210
4900210
4900230
4900250
4900250
4900270
4900270
4900230
4900310
4900310
4900320
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                                                                                                                                                                                                                                                                                                                                                                                                                                                   900360
                                                                                                                                                                                                                                                                                                                                                                                                                                                               900370
                                                                                                                                                                         FIRST DIMENSION OF ARRAY A, I.E. MAX. NO. OF ROMS.
                                   DETERMINANT OF A SPARSE IN-CORE REAL MATRIX, WITH PROTECTION AGAINST OVERFLOW AND UNDERFLOW. DETERMINANT IS GIVEN IN A SPECIAL FORM TO ALLOW REPRESENTATION OF VERY LARGE OR SMALL VALUES.
                                                                                                                                                                                                 WORKING STORAGE ARRAY OF AT LEAST 2*M REAL NOS.
                                                                                                                                                BRDER OF MATRIX A, I.E. ACTUAL NUMBER OF ROWS.
                                                                                                                       FØRTRAN DØUBLE ARRAY CØNTAINING THE MATRIX.
                                                                                                                                                                                                                         DETERMINANT IS GIVEN AS (16**NU) * D.
                                                                                                                                                                                                                                                                 EQUIVALENCE (P, IP)
CALL DCBMP2 (A, M, MID, T, T(M+1), NIX)
NU = 0
FOR, IS DET2, DET2
SUBROUTINE DET2 (A, M, MID, T, NU, D)
                                                                                                                                                                                                                                                                                                                                                                                                                          IF (A(III) 150,140,140
                                                                                                                                                                                                                                                              DIMENSION A(1), T(1)
                                                                                                                                                                                                                                                                                                              1F (NIX) 100,110,120
                                                                                                                                                                                                                                                                                                                                                                                      MID1 = MID + 1
                                                                                                                                                                                                                          NO. D
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               U. ABBUE DIAGONAL, A ELEMENTS CONVERT TO U ELEMENTS, AFTER PIVOT SELECTION (USING PARTIAL PIVOTING WITH IMPLICIT ROW SCALING), THE U(K,K) AND L(I,K) ELEMENTS ARE COMPUTED. AN ATTEMPT IS MEDER TO SUPPRESS TRIVIAL OPERATIONS BY SKIPPING THE LEADING ZERO TERMS IN EACH INNER PRODUCT. SUPER DOES THE INNER
                                                                                                                                                                                                                                                                                                                                                                                  LEAD(!) IS THE COLUMN INDEX OF IST NON-ZERO ENTRY OF ROW I.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    PREDUCT ACCUMULATION AND IS AVAILABLE IN FORTRAN AND (360)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               - IF LOOP FALLS THROUGH, COLUMN K IS ZERO AND A IS SINGULAR.
                                                                                                                                                                                                                                                                                                             IF LØBP FALLS THROUGH, RØW I 1S ZERØ AND A IS SINGULAR.
FOR, IS DCOMP2.DCOMP2
SUBROUTINE DCOMP2(A,M,MID,LEAD,ENT,NIX)
TRIANGULAR DECOMPOSITION OF A SPARSE IN-CORE MATRIX.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            FIRST .K COLUMNS CONTAIN ALL ZEROS BELOW ROW LAST.
                                                      INTEGER*2 LEAD
DØUBLE PRECISION S
DIMENSION A(1), LEAD(1), ENI(1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       = AMAXI'(G, ENT(I) *ABS(A(IK)))
                                                                                                                                                                                                                                                                                                                                                                  110.LEAD(() = (1, - 1) / MID +
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         . LOOP CAN-T FALL THROUGH.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          LAST = MAXO(LAST, MP1-3)
                                                                                                                                                                                                                                                                      IF (A(13)) 116,100,110
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         (A(JK)) 170,160,170
                                                                                                                                                                                                                                                                                                                                                                                                                     KJ = IJ, MM, MID
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             IF (A(JK)) 150,140,150
                                                                                                                                                                                                                                                  OIN.MM.I = LI
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               LASTK = KB + LAST - 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       I = LOW, LAST
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          ASSEMBLY LANGUAGE.
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                                                                                                                              EQUIVALENCE (EL,L)
                                                                                                                                                                                                                                                                                                                              NIX = -(1000 + 1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       LOW = JK - KB + 1
                                                                                                              DATA MONE / -1 /
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                                                                                                                                                                                                     MMIO = M * MIO
                                                                                                                                                                                                                                                                                                                                                                                                                                      G = ABS( A(KJ)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           - JK + MØNE
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 MAJOR LOOP.
                                                                                                                                                                                                                                                                                                                                                                                                                                                      ENT(1) = 16.
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(3)
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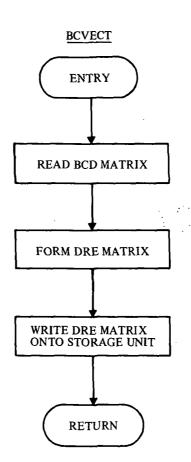
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\$100010 \$100020 \$100030 \$100040 \$100060 \$100080 \$100090 \$100100

FOR. IS SUPER SUPER (X,Y,LEAST,LIMIT,MID,S)
SUBROUTINE SUPER (X,Y,LEAST,LIMIT,MID,S)
DIMBENSION X(1), Y(1)
DOUBLE PRECISION S
S = 0.000
IF (LEAST - LIMIT) 100,100,120
IO0 IX = (LEAST - 1) * MID + 1
DO IA = (LEAST - 1) * MID + 1
DO IA = (LEAST - 1) * MID
IIO IX = IX + MID
IIO IX = IX + MID
IZO KETURN
END

SUBROUTINE BCVECT

This routine converts the eigenvector obtained during a converged eigenvalue pass into the form accepted by INITAL. The calculations are identical to those in the latter part of STRMAT, and result in the DRE array.



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4600170
4600180
4600190
4600200
SUBBUTINE BCVECT (NZ,QVEC,NØJS,JRTIC,JRSTØP,NREG)
DIMENSIØN QVEC(LZ8,1),BCO(LZ8,128),JRTIC(1),JRSTØP(1)
DIMENSIØN DRE(128,2)
REWIND 3
REWIND 14
RAJINH4 = 4*NØJS
READ(14) {(BCD(1,J),J=1,NZ),I=1,NJTNH4)}
DØ 800 J=1,NJTNH4
DRE(J,L) = 0.0
DØ 800 K=1,NZ
DØ 800 K=1,NZ
DØ 800 K=1,NZ
DØ 810 NR=1,NZ
DØ 71 NR=1,NREG
                                                                                                                                                                                                                                                                                                                                      REWIND 3
RETURN
END
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SUBROUTINE ETRAP

This is an error trap routine which can be called by the MAIN routine at various stages of program execution. If the indicator NIX is not equal to zero, MAIN will call ETRAP and indicate the proper message to be printed.

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2300120
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GO TO 505
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         4 FØRMATI/ 4X,-THE TYPE ØF MATERIAL PRØPERTY TABLE FØR A SEGMENT CA 2300310
INNØT BE IDENTIFIED AS ISØT, ØRTH, ØR STIF.-/)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            5 FORMATI / 4X,-THE WALL CONSTRUCTION OF A SEGMENT CANNOT BE IDENTIF 2300350
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            6 FØRMAT! / 4x,-THE TYPE ØF TEMPERATURE INPUT FØR A SEGMENT CANNØT B 2300390 1E IDENTIFIED AS THST, NØIH, THCN, ØR THIN.-/)
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                                                                                                                                                                                                                                                                                                                                                                                                                                4X,-BNE BF THE MATERIAL PROPERTY TABLES CANNOT BE IDENTI
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             Š
                                                                                                                                                      COMMON NST(30),NKL(30),NXMAT(20),SAVJTC(30),SAVSTP(30),JRTIC(30)
COMMON JRSTOP(30),NREG,NWPT,NRC,NSC,NIX,IERROR,KGEOM,IGEOM,ISTTAB
COMMON KELVIN,IBEGIN,NPROB,NSEG,NERROR,Q-HHICK,NDJS,NLINKS,NLCASE
COMMON NTSKL,NY,NBCT,LINDIT,NTRKL,NPASS,XNI,KBG,NRINGS
DOUBLE PRECISION SAVTIC,TIC,PHI,STOP,RESTOP,RTICK
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       2 FORMAT(/ 4x,-A MATERIAL PROPERTY TABLE NAME FOR A SEGMENT CANNOT 10E FOUND IN THE TABLE LIST.-/)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     40
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          FORMAT(/ 4x,-THE MAGIC CYCLE HAS GONE PAST STOP BY MORE THAN THE IPERMITTED VALUE. CHECK TO SEE IF FIXED STEP SIZE IS TOO LARGE.-/)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             BLANK,
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   12 FORMAT(/ 4X,-THE RIEMAN VARIABLE, IEND, WHICH SIGNALS THE END
1A SEGMENT SHOULD ONLY BE ZERO OR NEGATIVE ONE,-/)
                                                                                                                                                                                                                                                                                                                 GØ TØ (8000,8036,8086,8087,8089,8090,8013,8009,8031,8008,8001,
8002,8003,8006,8007,8067,8101,8102,8103,8104,8105,8106,
8107,8108,810,8108,8110,8088,110,8120,8841,8842,8777,8797,
                                                                                       COMMON STORY(16), XMAT(110,10), STD(10), SADUS(30), RADUS(30)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           BE ZERØ,
                                                                                                                                  COMMON XN, TEFREE, TIC, PHI, STBP, RESTBP, RTICK, G1, XNL(3), NH
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           9 FORMATI/ 4X,-THE LOAD INDICATOR CLUES CAN ONLY
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     EXECUTE
                                                                                                               COMMON TADUS (30) , UADUS (30) , SAVTIC (900)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    ITED AS SING, EQUA, UNEQ, OR BLAN.-/)
                                                                                                                                                                                                                                                                                                                                                                                                                                                 IFIED AS ISOT, ORTH, OR STIF.-/)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  10 FØRMAT(/ 4x,-THE PRØGRAM CAN IM PER DATA DECK,-/)
                                         INTEGER SAVJTC, SAVSTP, Q, THICK
                                                                                                                                                                                                                                                                                                                                                                                  8787), NERROR
                     SUBRBUTINE ETRAP
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1E, BR FBUR.-/)
FOR, IS ETRAP, ETRAP
                                                                                                                                                                                                                                                                       WR [TE(6,1726)
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                                                                                                                                                                                                                                                                                             FORMAT ( 1H1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          8007 WRITE(6,15
                                                                   INTEGER XN
                                                                                                                                                                                                                                                                                                                                                                                                            8000 WRITE(6,1)
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                                                                                                                                                                                                                                                                                                                                                                                                                             1 FORMAT(/
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8787 WRITE(6,34)
34 FØRMAT(/ 4x,-THE NUMBER ØF PØINTS IN THE ST TABLE MUST BE BETWEEN 2301250
1 2 AND 3C.—/)
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